

A MEASUREMENT STUDY OF THE ASYMMETRICAL IMPACTS OF THE PUBLIC EXPENDITURE POLICY ON THE ECONOMIC GROWTH IN IRAQ FOR THE PERIOD 2004-2021 USING (BOOTSTRAP NARDL)

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Abstract

This study aims at testing the asymmetrical impacts of the expenditure policy through its constituents on the economic sectors which are regarded as guaranteeing a real economic development in the Iraqi economy. The Non-Linear Autoregressive Distributed Lag NARDL has been used to create the critical values of the samples less than 30 observations of all the study variables since this model allows for the study of symmetry in the short and long-term relations. In other words, the impact of positive changes can be separated from that of negative changes of the independent variable on the dependent one. The researchers have relied on the annual data belonging to the Iraqi Central Bank for the dependent variable (The gross domestic product by the current prices expressing the economic growth in Iraq during the period from 2004-2021 and has been interpreted by means of the interpretation variables (operational expenses and investment expenses) of annual data expressing the public expenditure police in Iraq throughout the period of the study. It has been found out that the gross domestic product by the current prices responds to change (by positive values) and by a value larger for the negative changes in the investment expenditure during the study period., in addition to disparity as the positive and negative of the operational expenses have asymmetrical effect on the gross domestic product by the current prices. Finally, the product is largely affected by the negative changes of the operational expenses compared to the positive changes.

Key Words: Public Expenditure Policy, Economic Development, Bootstrap NARDL Model.

INTRODUCTION

The importance of the public expenditure policy on the economic growth is evident from its role in increasing the size of the economic resources that specify the production ability of any society. The investment expenditure contributes to the constitution of a capital through the projects carried out by the state. This is directly reflected on the growth of the domestic product. As for operational expenditure, it works on directing the production elements from one sector to another so as to create the balanced development. In the economy rent states as the case in Iraq is, oil revenues control the orientations of the public expenditure that specifies the effective total demand proportionally through the multiplier technique. When the public expenditure moves upwards, the effective total demands also rise to a new level to align with the government consumption and investment. The new size of the total demand is distributed over the different types of goods and services, some of which are domestically produced and others imported according to the flexibility of the productive system of those states.

The problem of this study focuses on the point that in spite of the increase in the ratios of growth of the public expenditure in Iraq, it does not arrive at its aim of achieving economic stability.

The significance of the study lies in its reliance on the analysis methods and the tools of economic measurement since the public expenditure is the main engine of all the constituents of the gross domestic product. As such, such a type of studies and economic analysis may assist in taking future decisions in Iraq where a number of total economic defects are prevalent.

The aim of the study is to test the asymmetric effects of public expenditure policy based on the constituents of the public expenditure, on the economic growth which viewed as the basis for guaranteeing a real economic growth of the Iraqi economy.

The study hypothesized that the policies of public expenditure vary in their ability to bring about economic stationary in the light of the difference in the economic circumstances as the Iraqi economy is totally economy rent.

The research depended in its methodology on studying the aspects of public expenditure and economic growth on the basis of theoretical methodology side by side with the inferential methodology that relies on inferring the results in the aftermath of studying the economic state, and by taking into account the outcomes and the relevant numbers that are the product of a set of activities, policies and decisions on the basis of scientific resources, publications, official statistics, researches and theses so as to validate the hypothesis, bring about the aim. To complete that, the study is divided into the following sections:

The Controversy over the Relation between the Public Expenditure and Economic Growth

The level of the gross domestic product is related to the size of public expenditure. Since governmental expenditure represents one of the constituents of this expenditure, it is natural that the level of the gross domestic product is affected by the variables of the size of the governmental expenditure. What is quite worth attending to is that the economic theory has not set final results concerning the effect of public expenditure on the economic growth? The models of gross economy refer to the existence of a relation between the governmental expenditure and the gross domestic product that expresses the most important indicators of the economic growth. Yet the nature and the direction of the relation are a subject of controversy in the economic growth in terms of identifying which factor affects which. There is a causal relation between public expenditure and the gross domestic product. The literature on economic growth has witnessed focus on the relation between the two variables. Examples are Wagner's study (1893) which was based on a positive relation between the economic growth and public expenditure. That is to say, whenever a certain society achieved a rate of economic growth, that will be followed by extending the state's financial activity and duly increasing the public expenditure by a rate larger than the increase achieved in the individual's share in the domestic product and this is under the effect of industrialization; that Keynes's hypothesis (1933) identified the role and importance of expenditure in the economic growth through the effect of the multiplier; and that Musgrave's model (1986) used the two indicators of the public

expenditures flexibility and its marginal slope with reference to the gross domestic product. It arrived at the conclusion that the phenomenon of the public expenditure increase is related to the type of growth and the development stages in the states' economies.

As for Barro's model (1990), the government expenditure is at the ideal size when the marginal productivity of the expenditure equals 1. Al-Galibi's study (2012) aimed at analyzing the relationship between the government expenditure and the gross domestic product in Iraq for the period 1975-2010 in the short- and long-terms. The results of the tests have indicated that the government expenditure and the gross domestic product are characterized by the property of unit roots and that they have a co-integration relationship. The statistical results of the model indicate the existence of evidences that there is a short causal and long-term relationship that is heading from the gross product to the government during the period of the study. Atiya's study (2018) to measure the impact of the asymmetrical growth of the financial policy in determining the form of the nonlinear relationship between the government expenditure and the economic growth by using NARDL model. Here a model has been used that permits the distinction between the impact of the positive and negative changes of the tools of the financial policy, and that it is in the short- and long-term. The study also concludes that there is a nonlinear relationship between the government expenditure and the economic growth. This means that there is a problem of the inability to draw the appropriate comprehensive economic policies.

Analysis of the Public Expenditure in the Iraqi Economy for the Period (2004-2021)

The importance of the expenditure policy is represented by a set of the governmental orientations that aim at creating the appropriate impacts in the economy. This policy differs from one state to another according to the nature of the existing economic system, the special orientations and the political and social circumstances within the state (Mahmood, 2019: 82). The public expenditure in the rent economies has a privacy that distinguishes it from other economies. As such, it is clearly noticed that the observation of the budgets of the net states entails the existence of a set of the types of the public expenditure that are concomitant with these budgets in terms of their consumption nature. Additionally, the great importance of the revenues of the oil resource and the absence of the other sources of revenues are also attended to. In the case of Iraq, the funding of the public budget depends on the oil source that is in the foreign currency. As the domestic public expenditure is in the Iraqi dinar, the government exchanges the oil dollars with the I.D. (Iraqi Dinar) at the Central Bank. By doing so, the Central Bank gets a foreign currency that nearly equals the annual domestic government expenditure. In this respect, the relationship between the exchange rate and public expenditure plays a crucial role in the economic growth side by side with the case that the public expenditure grows with the growth of the oil revenues and hence the domestic expenditure represented by its oil and non-oil types grows as well on the basis of that relationship and duly determining the monetary basis through the exported currency; the basic component of the monetary offer through those relationships that are represented by the strong rent economy hypotheses (Atshan, 2017: 57). The Permanent Income hypothesis of the economist Milton Ferdman (1957) can be borrowed so as to describe the state of the oil state governments in the

way of dealing with the income coming from the oil revenues. This outlines that the individual in case of getting additional income more than their usual income behaves on the basis that this income is permanent and does not reduce their consumption expenditure. This reflects on the economic, social and political situation in those countries that expends as if their income that is derived from the external surrounding, due to the oil revenues, is a constant permanent income and are not aware of the negative effects of the sudden fluctuations that may happen to this income that related to a good of an unstable price, and its direct impact on the public expenditure that may witness strong changes. As such, it is noticed that the current consumption public expenditure is related to the growth of the oil revenues in dollar and largely exceeds the growth of the gross domestic product. This indicates that there is a structural defect in body of the product components represented by the weakness of economic sectors in terms of the components of the gross domestic product. On the other hand, when the public expenditure increases, it cannot be easily reduced. With every rise in the prices, the current expenditure rises due to the low slope of saving from the natural resource and the increase in the components of the current consumption expenditure represented by the appointments, the social security network, and supporting the ration card and the oil products. This exposes the country to large financial crises and obliges it to lend and keep away from the necessities of real development Ali, 2021: 16). The public expenditure in Iraq is closely related to the revenues of the oil exports. The noticeable return of these exports to the oil market after 2003 and the increase in the revenues in the foreign currency have reflected on the size of the public expenditure especially in its operational side as the expenditure policy in Iraqi economy after 2003 has been characterized by increasing the operational expenditure at the expense of the investment expenditure due to the introduction of new items into the country's public budget represented by the increase in the salaries of the public sector and the costs of the reconstruction of Iraq. These items, especially those pertinent to wages and salaries have dominated the public expenditure and restricted the expansion of the investment expenditure (Al-Da'mi, 2018: 52). The path of the public expenditure policy can be followed through the following Table (1):

Table (1): The Relative Importance of the Structure of Operational and Investment Expenditure in the Iraqi Economy for the Period 2004-2021

The Relative Significance of Investment Expenditure to Public Expenditure % (6)=3/2	The Relative Significance of Operational Expenditure to Public Expenditure % (5)=3/1	Rate of the معدل Public Growth of % Expenditure (4)	Total of Public Expenditure (Billion ID) (3)	Expenditure Structure		Years
				Investment Expenditures (2) (Billion ID)	Operational Expenditures (1) (Billion ID)	
9.4	90.6	-	32,116	3,014	29,102	2004
17.3	82.7	-17.9	26,375	4,572	21,803	2005
15.5	84.5	47.1	38,805	6,027	32,778	2006
19.8	80.2	0.6	39,031	7,723	31,308	2007
20.0	80.0	52.2	59,402	11,880	47,522	2008
20.0	80.0	-11.5	52,566	10,513	42,053	2009
23.2	76.8	59.5	83,823	19,472	64,351	2010
22.6	77.4	-6.0	78,758	17,832	60,926	2011
23.0	77.0	14.7	90,375	20,756	69,619	2012
33.9	66.1	31.8	119,128	40,381	78,747	2013
29.8	70.2	-29.9	83,556	24,931	58,625	2014
26.4	73.6	-15.7	70,398	18,565	51,833	2015
23.7	76.3	-4.7	67,067	15,894	51,173	2016
21.8	78.2	12.6	75,490	16,465	59,026	2017
17.1	82.9	7.1	80,873	13,820	67,053	2018
25.4	74.6	38.14	111,723	28,377	83,345	2019
4.22	95.78	-31.9	76,081	3,208	72,873	2020
5.1	94.9	-19.07	61,572	3,078	58,493	2021

Source: The two researchers depending on data from Iraqi Central Bank, The General Directorate of Statistics and Researches. The Annual Publications 2004-2021.

From the data in table 1, it can be noticed that the value of public expenditure is 32,116 billion ID, and operational and investment expenditure 29,102 and 3, 014 billion ID respectively. Operational expenditure formed 96% of public expenditure while investment expenditure 9.4%. Such a low level of the ratio of investment expenditure is due to the destruction of most economic sectors during the war against the past regime in addition to Iraq's coming out of the war in 2003. As for the year 2005, the value of public expenditure was 36, 375 billion ID and operational expenditure 21, 803 billion ID with the ration 82.7% of the public expenditure, while the value of investment expenditure was 4, 572 billion ID with the ratio 17.3% of the public expenditure. The ration increased compared to the year 2004 as the government's orientation was to reconstruct what has been destroyed by the 2003 war.

Public expenditure in 2008 achieved an increase of the ration 52, 2% compared to the year 2007. It was 59,402 billion ID. The contribution by the investment expenditure was 20% while that of the current expenditure was 80% of the gross public expenditure. The rise in the public expenditure is due increase in the oil revenues that formed the main source of public expenditure. In 2009, the values of public expenditure including both operational and investment decreased and the value of public expenditure was 52, 566 billion ID while the operational expenditure was 42, 053 billion ID with the ration 80% of the public expenditure. Such a decrease in the value in the public expenditure is due to the occurrence of global crisis which was represented by the shock of a negative offer that has led to the decrease in the international oil prices. As for the year 2012, public expenditures rose by the ratio 14.7%

compared to the year 2011 due to the rise in the public expenditures including its investment and operational types. In 2013, public expenditure achieved its highest level (129, 129 billion ID) which an increase by 31.8% compared to 2012. In the year 2014, the value of public expenditure decreased by (-29.9%), i.e., 58,625) Billion ID, and operational expenditure (58,625) Billion ID by 70.2 % of public expenditure, while the value of the investment expenditure reached 24,931 billion ID by 29.8% of public expenditure. The reason behind the decrease in the value of public expenditure and especially operational expenditure compared to 2013 is that the budget of 2014 was not approved. This has made the Ministry of Finance restrict spending by the current real expenses of each symmetric month of the year 2014. The values of public expenditure went on decreasing in the years (2015 and 2016), when the values of public expenditure were 700.398 and 67.067 billion ID respectively.

This decrease is due to the occurrence of two shocks in the Iraqi economy that have noticeably affected all the statistical, economic and social indicators. The two shocks are represented by the decrease in the ratio of crude oil prices and the deterioration of security situation as 3 Iraqi governorates were controlled by terrorist groups (ISSI).

And what followed these events represented by increasing expenditure n military issues and increasing the service by the government to the displaced people and other war effects. In 2017, the value of public expenditure including its two types: operational and investment increased by 59,026 and 16,465 billion ID respectively. The public expenditure recorded a rise in 2019 by 38.1% to become 111,723 billion ID versus 80,873 for the year 2018. Such a rise is due o the growth of most constituents of current and investment expenditure, while there was a noticeable decrease in the public expenditure for the year 2020 by 31.9% to reach 76,081 Billion ID versus 111, 723 for the year 2019 due to the decrease in the current expenditure by 16.5% and also all the components of the operational expenditure due to the double crisis (health and the decrease in oil prices) and not setting the budget for the year 2020 and the decrease of the investment expenditure by 86.9% due to the spread of covid-19 virus, the halt of most enterprises and the decrease in oil revenues.

It is evident from what has been so far mentioned that there is instability in the structure of the public expenditure due to the semi-entire dependence on oil in getting revenue and then covering the public expenditure which is not guarantee as it depends on the foreign demand. What can also be noticed from public expenditure in Iraq depending on Table 1 that operational expenditure occupies the largest ratio of the expenditure throughout the period of the study, while investment expenditure did not form a parallel importance of operational expenditure in spite of its betterment during the last years? Yet the ratio of this part of expenditure to the gross public expenditure did not exceed in its better state the ration 33.9%. As such a large gap remained between it and operational expenditure.

Analysis of the Orientations of Developing the Gross domestic Product in Iraqi Economy for the Period 2004 to 2021.

Economic growth is viewed as one of the most important indicators that express the progress level of the societies. The economic growth does not represent the increase in the gross

domestic product only, yet it should also lead to the increase of the real income of the individual; i.e., putting aside the impact of the change in the currency value (The purchase power of the currency). Then the average of economic growth should exceed that of the growth in the number of the population in the long run. Also, such an increase in the gross domestic product should go for a long not a short and casual period of time (Ubaid, 2020: 1). In the long run. The path of the growth in the gross domestic product by means of the current prices, fixed prices and the man of the individual's share in gross domestic product in the Iraqi economy for the period 2004-2021 on the basis of Table 2 below:

Table (2): The Development of the Gross Domestic Product by Current and Fixed Prices and the Per Capita Mean (2004-2021)

The Rate of Service Activities of the GDP by Current Prices % (9)	The Rate of Distributional Activities of the GDP by Current Prices % (8)	The Rate of Good Activities of the GDP by Current Prices % (7)	Per Capita		Gross Domestic Product by Fixed 100=2007Prices		Gross Domestic Product by Current Prices		Years
			Growth Rate (6)	Million ID (5)	Growth Rate (4)	Billion ID (3)	Growth Rate % (2)	Billion ID (1)	
13.1	11.7	75.2	-	2.00	-	101,845	-	53,235	2004
13.8	12.8	73.4	30.0	2.60	1.7	103,551	38.1	73,533	2005
18.6	14.4	67.0	26.9	3.30	5.6	109,389	30.0	95,587	2006
20.8	14.1	65.1	15.2	3.80	1.9	111,455	16.6	111,455	2007
19.4	14.8	65.8	34.2	5.10	8.2	120,626	40.9	157,026	2008
26.5	20.0	53.4	-19.6	4.10	3.4	124,702	-16.8	130,643	2009
23.4	21.7	54.9	22.0	5.00	6.4	132,687	24.1	162,064	2010
20.3	12.7	66.9	30.0	6.50	7.5	142,700	34.1	217,327	2011
22.1	12.5	65.4	13.8	7.40	13.9	162,587	17.0	254,225	2012
21.8	14.5	63.7	5.4	7.80	7.6	174,990	7.6	273,587	2013
21.4	15.5	63.1	-2.6	7.60	2.3	178,951	-2.7	266,332	2014
31.5	21.3	47.2	-27.6	5.50	2.6	183,616	-26.9	194,680	2015
33.6	20.4	46.0	-1.8	5.40	13.8	208,932	1.2	196,924	2016
26.8	20.3	52.9	13.0	6.10	-1.8	205,130	12.5	221,665	2017
22.8	20.0	57.2	16.3	7.10	2.5	210,532	21.3	268,918	2018
22.55	19.95	57.50	0	7.10	5.9	223,075	3.3	277,884	2019
32.4	21.2	46.4	-29.5	5	-15.6	188,112	-28.4	198,774	2020

Source: The two researchers depending on data from Iraqi Central Bank, The General Directorate of Statistics and Researches. The Annual Publications 2004-2021.

It is noticed from the statistical data in Table (2) that the gross domestic product by the current prices for 2005 reached 73, 533 billion ID. Thus, an annual increase by 38.1% was achieved compared to the year before. Also, the per capita of the gross domestic product was 2, 60 Billion ID; thus, achieving an increase by 30% compared to the year 2004. The value of the gross domestic product by current prices rose in 2007 by 16.6% compared to 2006. This rise in the value of the domestic product for the year 2007 is due to the relative improvement in the security and economic situation in the country and the increase in the exported oil revenues due to the rise in the oil prices at the international level. The per capita rose from 3.30\$ in 2006

to 3.80 million ID in 2007, i.e., by 15.2%. As for the year 2009, the statistical data indicates a decrease in the rate of gross domestic product by 16.8% compared to the year 2008 due to the decrease in the oil prices as a result of the effects of the international financial crisis (The Crisis of State Mortgage). Regarding the year 2014, the gross domestic product by current prices decreased by 2.7% compared to the year 2013. The per capita by current prices decreased from 7.80 million ID in 2013 to 7.60 million ID in 2014. This is due to the unstable political situation, the growth of terrorist operations and the bad security situation due to the ISSI control of large areas of Iraqi land that contain large oil fields in such a way that led to low exports of Iraqi oil. All this in addition to the fast decrease in oil prices which led to a decrease in oil exports, the inflexibility of the production system, the absence of the diversity of the income sources as Iraqi economy fully depends oil revenues; resulted in a decrease in the growth levels of the national economy. As for 2016, the value of the gross domestic product by fixed prices rose by 13.8% compare to 2015. It recorded 208,932 billion ID Vs. 183,616 billion ID for 2015. Also, the value of the gross domestic product by current prices rose by 1.2% compared to 2015, while the mean of Per Capita of the gross domestic product reached 5.40 million ID for 2016 Vs. 5.50 million ID in 2015; i.e., a decrease ratio by 1.8%. In 2018, the value of the gross domestic product by current prices rose to be 268,918 billion ID Vs. 221.665 billion Id in 2017. This means it rose by 21.3%. The mean of the Iraqi Per Capita of the gross domestic product rose by 16.3% in 2018 compared to 2017 and reached 7,10 Billion ID. The reasons behind the increase in the Iraq gross domestic product are the rise in international oil prices and the increase in the daily rate of oil exports compared to 2017. In 2020, Iraq economy witnessed a tangible decrease in the level of its performance. Covid-19, the decrease in international oil prices and OPED decisions had several negative effects on the gross domestic product whether by current prices or fixed prices. The local product by current and fixed prices decreased by 28.4% and 15.6% respectively. It is evident from Table 2 that goods sectors were sometimes positively and sometimes negatively affected by the increase and decrease in the international prices of crude oil for the period 2004 to 2021. This was basically due to the increase and decrease in the product of mining and quarries. The mean of the ratio of goods sector's contribution to the gross domestic product reached 60.06% during the period 20014 to 2021. The distribution sectors also witnessed states of increase and decrease that were basically due to the product of the sectors transportation and the gross and unit trade. The mean of the ratio of the contribution by the distribution sector to the gross domestic product reached 16.93% for the period 2014 to 2021, while the increase and decrease in the services sector product were due to the increase and decrease of the personal and social development services. The ratio of the contribution of the services sector to the gross domestic product was 23.01% for the period 2014 to 2021.

From what has so far been stated, and in terms of the structure of the gross domestic product, the ratios of the contribution by the economic sectors in creating the gross domestic product vary. Yet such variation has been accompanied by a real and well-established fact represented by the oil, mining and quarries sectors' gaining of the highest ratio of contribution to create the gross domestic product side by side with the fluctuations in the rise ratios related to the unstable external and internal economic and political circumstances that the Iraq economy experienced

during the period of the study. All this is added to the effect of the oil variable at the international level especially its prices that affected the contribution ratios. As such, the direct and indirect effect by the oil sector on the components of the gross domestic product reached 85% and the remaining was due to the non-oil product by about 15% only.

Measurement of the Asymmetrical Effects on the Public Expenditure Policy on the Economic Growth in Iraq for the Period 2004-2021 Using Bootstrap NARDL

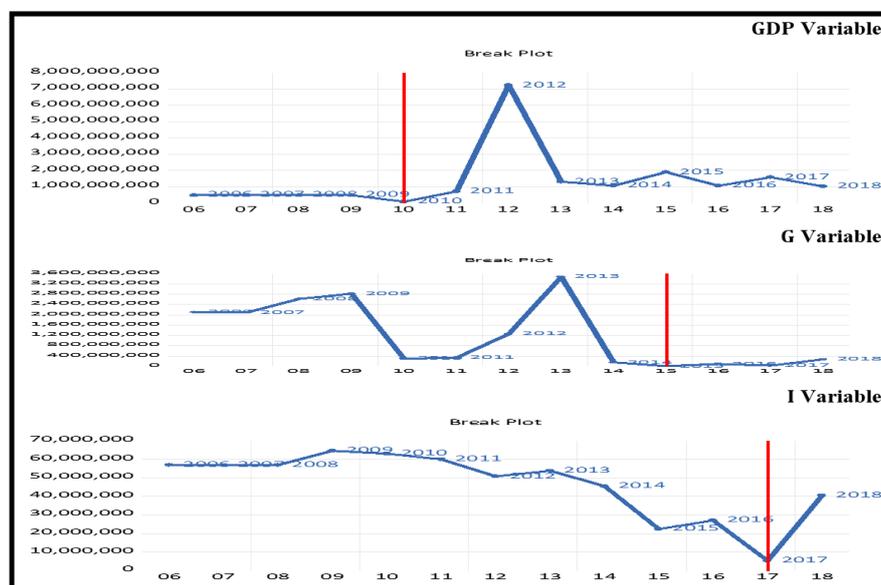
The Non-Linear Autoregressive Distributed Lag (NARDL) was developed by Shin, Yu and Nimmo in 2014. It represents a strong tool to test integration between the variables in one equation. It allows studying asymmetry in short and long-term relationship. That is to say, the impact of positive changes can be separated from that of negative changes of the independent variable on the dependent variable (Shin, 2014: 1). And that bootstrap NARDL is used through the implementation of the suitable initiation method due to some points of weakness that are inherent in ARDL model presented by Pesaran et al (2001). It is through bootstrap NARDL that the critical value of F bound Test occurs in the doubt zone. On this basis, a better vision about the co-integration state of the model is available (Sam, 2020: 9). To measure the impact of the public expenditure policy on the economic growth in the Iraqi economy, the Bootstrap NARDL will be used to study the nonlinear co-integration relations. This method allows the study of asymmetry between the variables in both short- and long-term. Added to that, this methodology can be applied despite the fact that the time chains are integrative of the first class or stable at the level. The main condition is that they are not integrative and of the second class, and that they work on disclosing the hidden co-integration between the time chains by means of positive and negative shocks for all or some independent variables. For instance, the positive shock of oil prices may have an absolute impact that larger in the short term while the negative shock may have an absolute impact in the long-term (Meo, 2018: 5). The bootstrap NARDL will be used to generate the critical values of the samples less than 30 observations of all the study variables on the basis of the annual data of Iraqi Central Bank for the dependent variable (The GDP by current prices) expressed by economic growth in Iraqi throughout the period from 2004 to 2021 that can be interpreted by the interpreting variables (operational expenditure G and investment expenditure I) that have annual variables that express the public expenditure policy in Iraq during the study period.

Test of the Nonlinear Unit Root

The latest developments in the tests of unit root often focus on the use of the nonlinear models and the tests with structural fractures. If the time chains of the variables contain structural breaks in the courses of their development due to the economic expansion or stagnation or the economy of strong revenue or exceptional events such wars or nature events, the traditional test of the unit root would arrive at fake results. The tests of the structural fracture were first introduced in 1989 by Perron and the tests conducted by Zivot and Andrews (1992); Lee and Strazicich (2003) and Carrion-i-Silvestre et al (2009). They were later developed to determine the number of structural fractures in the time series. Christopoulos and Leon-Ledesama (2010) to test the unit root that is jointly calculated for the structural joints and the nonlinear modification. They modeled the structural fractures by Fourier's function that is within the

frame of the advanced standard modeling dimensions that combine the dimension in time domain and frequency. The most updated nonlinear unit root test is that by Guris, Burak (2017) that has modeled the structural joints by Fourier's function. The nonlinear exactness by ESTAR model, the exponential transfer function. According to most tests of the nonlinear unit root, the results of the tests of the classical unit root such as ADF, PP, KPSS, which put forward the condition that the series of linear structure would give fake results by ignoring the structural changes in the time series (Guris, 2017: 3-4). To overcome this problem, the current study will use Carrion-i-Silvestre et al's test (2009) to find out the structural fracture of the study variables and Guris Burak test (2017) for the nonlinear unit root of the study variables and as follows:

Diagram (1) Summary of the Results of Carrion-i-Silvestre et al's test (2009) to Find out the Structural Fracture of the Study Variables



Source: The Researchers depending on EViews 12.

The study of the statistical properties of time series forms a basic element in understanding and interpreting the static and dynamic behavior of the periodical fluctuations of the economic variables. As such, the stability tests represent the main method to determine the path of economic variables and the specification of the sources of the shocks that impact their fluctuations. It may be a fast, slow or gradual structural change. In this respect, the structural change to be estimated may be known or unknown. Figure (1) above helps in clarifying the structural breaks on the stagnation of the time series at the level of the study variables. The drawn series demonstrates the occurrence of structural fracture at the level. It is event that it is not back around the same mean at all times. The results of Carrion-i-Silvestre Test show that there are structural reflection points in the time series of the study model. As such, we will rely on the nonlinear models that will enable us to estimate the models of structural reflections by using Guris, Burak (2017) test that takes into account the structural fracture.

Table (3) Summary of the Results of Guris, Burak’s Test of the Nonlinear Unit Root of the Study Variables

Variables	Guris (2017) Test Stats (Trend and Intercept)	F- Stats	The decision
GDP	4.254772	9.716027	I(1)
G	4.383301	3.689176	I(0)
I	5.832813	9.751615	I(1)

Source: The researchers depending on E Views 12

After determining the real compounds (structural Reflection points) of the data of nonlinear time serials of the study variables, Guris, Borak Test (2017) was carried out by the fixed and general direction. The result of the test show that the variable (Operational expenditure G) is stable at the level 1(0) and that the variables (GDP) by current prices and investment expenditure I are not stable at the level; i.e., they contain the nonlinear unit root and that they become stable after taking its first difference 1(1).

- The Co-integration Test Using Bootstrapping Bound Test

After verifying that the data of the time serials of the basic variables are stable, and after determining the degree of their integration, this description of the long-term relationship requires testing the existence of a co-integration relationship; the existence of a long-term balanced relationship by Bound Test which is clarified in the Table:

Table (4): Summary of the Results of Co-Integration by Bounds Method: Bootstrapping Bound Test

Test Statistic	Value	K
Overall-F	28.472	2
Generating the Critical Value by Using Bootstrapping		
Significance	I(0)Bound	I(1)Bound
%10	2.63	3.35
%5	3.10	3.87
%1	4.13	5

Source: The researchers depending on EViews 12

Table (1) illustrates the results of the Bound Test. It is noticed that the calculated value (F-statistics) is 28.472. It is larger than the high and low tabulated value at the significance levels 10%, 5%, and 1%. As such, there is a long-term balanced relationship and the null hypothesis which reads that there are no co-integration relationships between the study variables is rejected, and the alternative hypothesis which states that there is a long-term balanced relationship between the study variables during the period 2004-2021. These variables are not too far from each other in the long-term since they follow a similar behavior.

Results of Estimating NARDL Model

After conducting the nonlinear unit root tests and determining the degree of time series co-integration of the variables of economic growth in Iraq, and since these time series are characterized by being stable at different degrees of the level and the first difference is that NARDL model can be used. Additionally, the study model has been estimated by determining the dependent variable which is the natural logarithm of GDP. The interpreting variables are the natural Logarithm of the cumulative sum of the positive values of (G_POS), the natural logarithm of the cumulative sum of the positive values of (I_POS), and the natural logarithm of the negative values of (I_NEG) during the study period 2004-2021.

Table (5): Summary of the Estimation Results of NARDL Model

Dependent Variable: LOGGDP				
Method: ARDL				
Date: 02/04/22 Time: 17:18				
Sample (adjusted): 2005 2021				
Included observations: 16 after adjustments				
Maximum dependent lags: 2 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (1 lag, automatic): Log I_POS Log I_NEG Log G_POS Log G_NEG				
Fixed regressors: C				
Number of models evaluated: 32				
Selected Model: ARDL (2, 1, 1, 0, 0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Log GDP (-1)	0.070408	0.260877	0.269888	0.7950
Log GDP (-2)	-0.294294	0.196660	-1.496461	0.1782
Log I_POS	0.245169	0.064564	3.797318	0.0067
Log I_NEG	0.117313	0.211287	0.555233	0.5960
Log G_POS	0.422343	0.302997	1.393882	0.2060
Log G_NEG	1.075098	0.508415	2.114607	0.0723
R-squared	0.958694	Mean dependent var		12.16394
Adjusted R-squared	0.911487	S.D. dependent var		0.326632
S.E. of regression	0.097177	Akaike info criterion		-1.526253
Sum squared resid	0.066103	Schwarz criterion		-1.091671
Log likelihood	21.21002	Hannan-Quinn criter.		-1.503999
F-statistic	20.30835	Durbin-Watson stat		2.493612
Prob(F-statistic)	0.000348			

Source: The researchers depending on EViews 12

It is evident from Table (5) that:

- For the test of the significance of slope equation of the economic growth function expressed by GDP by current prices, the calculated F statistics value equals 20.30835 which is a basic value at any significance level 10%, 5%, 1%. This is confirming the value that is equal: Prob F-statistic = 0.000348. As such, the null hypothesis is rejected and the alternative hypothesis which states that at least one of the slope correlations is significantly different at 0 (Zero), and

duly the essence of the equation as a whole to impact the dependent variable of GDP by current prices.

- The interpreting variables (G and I) in determining the behavior of the dependent variable are evident from R^2 that equals 0.95. This means that 95% of the variables taking place in the dependent variable of GDP by current prices are due to the interpreting variables and the rest belongs to variables that cannot be measured or there are errors in the model estimation.

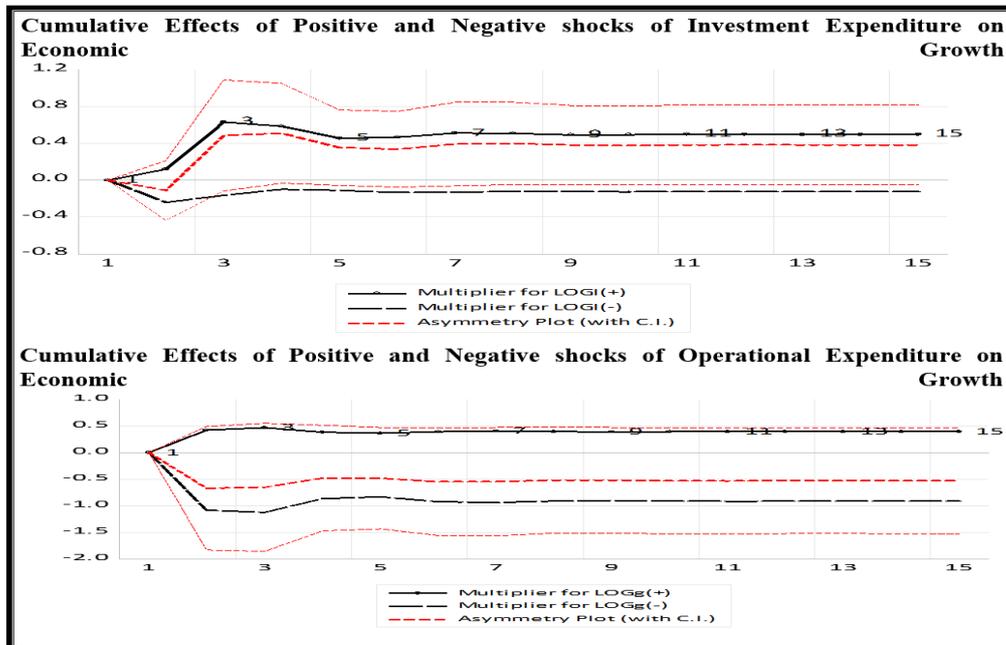
- Concerning the nonlinear model, it is clear that GDP by current prices responds to the change (positive values) of investment expenditure and by a value larger for negative changes in operational expenditure during the study period. The values reached (0.245169) which is significant at the level 5%.

- The existence of an asymmetry is evident from the estimation results. Both positive and negative changes of operational expenditure have an asymmetric impact on GDP by current prices. As such, the product is largely affected by the negative changes of operational expenditure compared to the positive changes. This is due to the fact that the components of the operational expenditure mostly form the item of salaries and wages. They are inflexible when the operational expenditure that is related to the oil revenues decrease. As such, the product is affected by the negative changes of operational expenditure and positively by the changes of the investment expenditure through the multiplier factor. The value reached (1.075098) which is significant at the level 10%.

The Multiplier of Cumulative Effects of the Shocks of the Positive and negative Policy of Public Expenditure on the Economic Growth in Iraq for the Period 2004-2021

The test of the Effect of the cumulative dynamic multiplier is done to explain the process of adaptation and the period of imbalance that is resulted from the positive or negative shock of the independent variable on the dependent variable. It also allows to trace the types of asymmetric modifications that take place in the dependent variable after all the positive and negative changes in the independent variable (Atiya, 2018: 15). The difference in the time period ascertains the existence of asymmetry of changing effects the policy of public expenditure on the economic growth during the period of expansion and deflation. To clarify the long-term asymmetric effect of the public expenditure policy on the economic growth, the dynamic multipliers demonstrated in fig (12) can be used:

Figure (2): The Multiplier of Cumulative Effect of the Positive and Negative Shocks of Investment and Operational Expenditure on Economic Growth in Iraq for the Period 2004-2021



Source: The researchers depending on EViews 12

Figure (2) shows the dynamic multipliers for the period of 15 years. The interrupted red line refers to the difference between the impact of the positive shock by 1% and the negative shock by 1%. The thin (fine) interrupted red lines resemble the trust scope of the difference of the impact of the two shocks (positive and negative). The continuous black line refers to the shock of the positive expenditure (operational and investment). The interrupted black line refers to the negative shock.

It is noticed from the results that the behavior of the two curves that express the impact of the positive and negative shocks approves the short-term counterpart relationship. The increase of the investment by 1% will lead to an increase in GDP by current prices by 0.12% in the second year. It then rises to 0.63% in the third year. It then returns and stays stable in its movement in a semi fixed form and near to 0.50% till the 15th year. It is also evident that the impact of the cumulative dynamic multipliers of the negative changes seems to be quiet with a stable direction by 0.12% and that this relationship is constant throughout 15 years. The figure also shows that the changes of the investment expenditure will lead to the shift of the balanced curve whether in the case of positive or negative shocks. What enhances this result is that the curve of the differences between impacts largely aligns with horizontal axis.

Figure (2) also shows the impact of the cumulative dynamic multipliers of the operational expenditure that have positive changes in GDP by current prices is less than that of cumulative

dynamic multipliers of negative changes. When the operational expenditure rises by 1%, the DP by current prices immediately interacts and increases by 0.45% in a nearly stable form throughout 15 years, yet the negative effect of the same variable would have stronger effects, as the product will decrease by 0.92% when the operational expenditures decrease by 1%. This confirms asymmetry in the impact of the operational expenditure on GDP by current prices.

4.1 Tests of Quality of NARDL Model

To ascertain the quality of the model utilized in measuring the effect of public expenditure policy on economic growth in Iraq for the period 2004-2021 and the absence of measuring problems, it was obligatory to carry out some diagnostic tests as in Table (6) below:

Table (6): Summary of the Results of the Tests of the Study Model Quality

Prob	indicator Correlation	Indicator	Test
0.1989	3.229812	Breusch-Godfrey Serial Correlation LM Test	Serial Correlation Test
0.5324	7.039435	Breusch-Pagan-Godfrey	Variation symmetry Test
0.6852	0.755834	Jarque Bera	Normal Distribution tests

Source: The researchers depending on E Views 12

Based on the values of the tests of quality stated in Table (9), it is evident that the absence of the serial auto correlation between the values of the estimation remnants as fixed by Breusch-Godfrey Serial Correlation LM Test. The Prob. Chi-square value = 0.1989 is larger than 5%. This means the acceptance of the null hypothesis and the rejection of the alternative hypothesis, additionally, the remnants of the model do not have the problem of the consistence of variation symmetry as it is illustrated by Breusch-Pagan-Godfrey test as the value Prod. Obs*R-squared = 0.5324 is larger than 5% which means the acceptance of the null hypothesis and the rejection of the alternative hypothesis, while the remnants of the model naturally distribute as fixed by Jarque Bera test as the JB value = 0.775834 and Prob value =0.685287 that is larger than 5%. This means that the null hypothesis is accepted and the alternative hypothesis is rejected.

Conclusions:

1. The ration of public expenditure to GDP by current prices reached the mean 38.43% during the period 2004-2021. It is a high ratio and refers to the expanding intervention by the state in the economy.
2. The ratio of the investment expenditure to the public expenditure reached the mean (19.9%) during the study period is a low ratio. It can be stated that it is the reason of the lag in the infrastructure of the Iraqi economy. This has resulted in the absence of variety in the production basis and one-sided rent economy.
3. From the nonlinear model of the study, the GDP by current prices responds to change (by positive values) of the investment expenditure and a larger value of the negative changes in the operational expenditure during the study period.

4. Based on the estimation results, asymmetry was found out. The positive and negative changes in the operational expenditure have asymmetrical impact on GDP by current prices. As such, the product is largely affected by the negative changes of the operational expenditure compared to the positive changes.
5. From the results, the behavior of the 2 curves that express the impact of the positive and negative shocks approves the short-term counterpart relationship. The increase in the investment expenditure by the rate (1%) will lead to an increase in GDP by the current prices at the rate (0.12%) in the second year; it then rises to (0.63%) in the third year. It then returns and keeps stable in its movement in a semi-constant form or near (0.50%) till the 15th year. It is evident that the effect of the cumulative dynamic multipliers of the negative changes are quiet with a stable direction by the ration (0.12%), and that this relation goes on for 15 years.
6. The impact of accumulative dynamic multipliers of operational expenditures of positive variables on the gross domestic product by current prices is less than that of accumulative ones of negative variables. When the operational expenditures rise by the rate 1%, the local product by current prices immediately interacts and goes up by the rate 0.45% in a form that almost settles for 15 years.
7. The effect of the cumulative dynamic multipliers of the operational expenditure of positive changes on the GDP by current prices is less than that of cumulative dynamic multipliers of the negative changes. When the operational expenditure rises by 1%, the local product immediately interacts by current prices and rises by 0.15% in an almost stable form for 15 years. Yet the negative effect of the same variable has strong repercussions. The product decreases by 0.92% when the operational expenditure decreases by 1%. This confirms the asymmetry in the effect of operational expenditure on GDP by current prices.

Recommendations

1. The state should identify the obstacles that impede the public expenditure policy and the orientation to accommodate the policies of economic multiplicity/ variation.
2. The attempt to achieve the balanced economic development in all the sectors that contribute to the expansion of the goods offer base, the flexibility of the productive system and getting rid of the revenue economics cycle. Here, the product should be developed within certain limits in isolation from the development of the public expenditure.
3. Minimizing public expenses, solving the error/problem in the expending structure, and increasing the investment expenditure in the production domains.
4. Setting developmental strategies with vivid objectives and d=giving priority to the programs and sectors that guarantee the achievement of the sustainable economic development.

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