

The Long-Run Relationship between Disaggregated Government Expenditure and Economic Growth in Jordan

Elham Mohammad Alhaj Yousef*

The Excellencors for Training and Performance Development Company, Amman, Jordan. *Email: chajsuper1@hotmail.com

Received: 10 September 2021

Accepted: 19 May 2022

DOI: <https://doi.org/10.32479/ijefi.11912>

ABSTRACT

The main purpose of this study is to investigate the long run impact of capital and current government expenditures on the economic growth of Jordan during the period 1990-2019. The study variables are integrated of different orders as indicated by Augmented Dickey-Fuller unit root test. Granger causality test has demonstrated the ability of both government expenditure components to cause and predict changes in the economic growth. Engle and Granger cointegration test has revealed that there is a cointegrated long-run relationship between the study variables. Therefore, the study model was estimated by applying two estimation methods; Fully Modified Ordinary Least Squares (FMOLS) and Autoregressive Distributed lag models. The results of both methods showed that capital government expenditure has a significant positive long-run impact on the economic growth, while current expenditure has a significant negative long run impact on such growth according to FMOLS results. Based on these outcomes, the study recommends some procedures that must be implemented by the Jordanian government in order to increase its productive investments and reduce current expenditure.

Keywords: Economic Growth, Government Expenditures, Jordan

JEL Classifications: H5, O4

1. INTRODUCTION

Government spending as a tool of fiscal policy plays a significant role in stabilizing economy and achieving economic growth. In addition, it has the ability to influence aggregate demand, thereby affect the real output. The importance of this tool emanates from the fact that public spending is considered the main drive for many economic activities in the country, therefore, public finance is a prime tool implemented by government to achieve economic and social development.

In the small Jordanian economy, there is a growing need for a sound fiscal policy especially after the difficult circumstances the country has been through. Jordan's economy was severely affected by the Jordanian Dinar exchange rate crisis of 1989, the drop in oil prices in 1998 which had an adverse effect on trade-offs with oil-exporting Arab countries, as well as the adverse consequences of the global financial crisis of 2008. Jordanian general budget

was also negatively affected by sanctions imposed on Iraq and the great burden of its public debt. In light of these circumstances, the efforts of economic reform program made from 1989 to 1998 were evaluated in order to address its drawbacks and reinforce a new national economic reform for combating poverty and unemployment, realizing gradual increases in economic growth rate, maintaining the stability of Jordanian currency exchange rate, controlling inflation rate and reducing the budget deficit as a percentage of gross domestic product (GDP). Within this context, Jordan signed a 2-year agreement with International Monetary Fund (IMF) for economic reform program until 2004, aiming at achieving sustainable economic growth and improving the living standards. Therefore, this study is conducted as it aims at analyzing the long run impact of capital and current public expenditures on the economic growth of Jordan, by using annual data over the period from 1990 to 2019. The findings of this study help to draw up some recommendations, wishing that policy makers would take them into consideration when they are designing and applying public policies.

Jordan has a small economy and suffers from the scarcity of natural resources and low economic growth rates. In spite of these facts, the size of Jordanian government measured by its expenditures to GDP, has been too high throughout the last three decades. This matter necessitates the need to determine the public spending component that can positively affect the real output in order to focus on and properly utilize as a fiscal policy instrument for stimulating and stabilizing the Jordanian economy. This study decomposed public expenditures into current and capital expenditures to investigate their effects on the economic growth and answer the following two questions:

1. What is the relationship between capital government expenditure and the economic growth in Jordan?
2. What is the relationship between current government expenditure and the economic growth in Jordan?

1.1. Objectives of the Study

1. This study aims at examining the impact of disaggregated public spending on the economic growth of Jordan during the period 1990-2019.
2. Drawing up some recommendations based on the study outcomes, wishing that policy makers would consider for improving the economic performance.

1.2. The Importance of the Study

1. Emphasizing the role of government spending as a main tool of fiscal policy in stimulating and stabilizing the economic growth in Jordan.
2. Highlighting the significance of other macroeconomic variables such as openness to trade as a main impetus for boosting the economic performance.
3. Enriching the existing literature hence the empirical studies on this topic for the Jordanian economy are few and inconclusive.

2. LITERATURE REVIEW

The historical debate among economists regarding the role of public expenditures in gearing the real economy is unsettled so far. For example, Wagner's law stated that government spending is an endogenous factor and not a cause of stimulating economic growth. On the other hand, Keynes (1936) argued that fiscal policy is the only solution for stimulating economic growth when the economy is enduring a liquidity trap and suffers from severe recession, this is because the increase in money supply fails to increase the real output, since interest rate is already at or close to zero bound. Keynesian macroeconomic theory has stated that government spending is a source of economic stability, as the aggregate demand increases when government spending increases, resulting in a growth in the real output, in other words, expansionary fiscal policy can cause economic boom. Similarly, endogenous economic growth models such as (Romer, 1986; Barro, 1990; Barro and Sala-i-Martin, 1992; Colombier, 2009), have emphasized the important role of productive government expenditure in affecting economic growth positively in the long run, because they believe that economic growth can be internally generated through endogenous factors and they also accept the concept of constant and increasing returns to capital, consequently, the convergence would not occur at all.

Barro (1991) contended that increased public consumption is associated with an increase in taxes, leading to a distortion of economic incentives, discouraging investments and hence hindering the economic growth. On the other hand, and based on the law of diminishing returns, the neoclassical growth model has only focused on the external factors (such as technological progress) that can affect the economic growth, since fiscal policy could not bring about changes in the real economy according to this model. In general, the classical economic theory has ensured the ineffectiveness of public spending in stimulating economic growth as a result of crowding-out effect and distortionary effects of taxation. Post-Keynesian economists have contended that increasing public expenditures leads to business cycle instability and economic downturn in the long run. From another point of view, Sargent and Wallace (1975) assured the ineffectiveness of all economic policies based on the rational expectations theory, thus they concluded that only stochastic shocks could influence the real economy. Ram (1986) argued that public expenditures on the core areas of public sector have a positive impact on economic growth, while expenditures on non-core areas have a negative influence on such growth. Other economists found a middle ground where public spending can have a positive effect on the economic growth up to a certain threshold, above which the impact of this spending turns to be negative on growth (Friedman, 1997).

The empirical studies on the impact of public expenditures on economic growth have revealed that this subject is still open to further research, as existing findings are inconclusive and vary from one country to another. This variation could be explained by several factors ranging from the peculiarity of fiscal policy reforms that each country implemented over a certain time period to the choice of the study period and variables, as well as the methodology adopted in conducting these studies. Therefore, there is no clear-cut generalization as to the effect of government expenditures on economic growth. The following studies in this paragraph have found negative impact of government expenditures on the economic growth. For example, Barro (1991) investigated the impact of several macroeconomic variables, including investment and consumption public expenditures on economic growth, using data for 98 countries over the period 1960-1985. The study revealed that consumption expenditure is inversely related to economic growth, while investment expenditure has insignificant impact on growth. Taban (2010) investigated the impact of government expenditures on Turkish economic growth using quarterly data over the period 1987Q1-2006Q4. The results of ARDL bounds testing approach revealed that total government spending and government investment spending have negative effects on economic growth in the long run. While the results of causality test clarified a bidirectional causality between total government spending and economic growth, and unidirectional causality running from economic growth to government investment spending. Lupu et al. (2018) also examined the effects of public expenditures on the economic growth in 10 European countries during the period 1995-2015. Public spending was disaggregated into 10 categories. Based on ARDL estimation method, the study demonstrated that public expenditures on defense, public services, economic affairs, and social welfare have a negative impact on the economic growth,

while expenditures on education and health care have positive effects on the growth of these countries.

On the other hand, several studies have found positive impact of government expenditures on the economic growth. For instance, Wahab (2011) examined the impact of aggregated and disaggregated public spending on the economic growth using panel data for two samples; the first one for aggregated public spending in 97 developing and developed countries over the period 1960-2004, and the second sample for disaggregated government spending in 32 countries over the period 1980-2000. From the first sample, he found that aggregate government spending has a positive effect on the economic growth, while the second sample revealed that government investment spending has a positive output growth. Shahid et al. (2013) also investigated the relationship between government expenditure and economic growth of Pakistan during the period 1972-2009. The expenditure was split into development and current expenditures. The ARDL model used for estimation revealed the significant positive impact of development expenditures on economic growth of Pakistan. Alshahrani and Alsadiq (2014) explored the long and short run relationship between various types of public spending and economic growth in Saudi Arabia during the period 1969-2010. They used several econometric techniques and found that healthcare expenditures and public investment have a positive long run impact on economic growth of Saudi Arabia, while housing sector expenditures and trade openness have a positive short run impact on such growth. Abu-Eideh (2015) explored the causal relationship between public expenditures and economic growth in the Palestinian territories over the period 1994-2013. He used descriptive statistics and Engle-Granger cointegration test to examine the existence of long-run relationship between public expenditures and GDP growth. He found a long-run relationship between used variables. He also applied Granger causality test and found that both public spending and GDP have a causal effect on each other. Moreover, Onifade et al. (2020) has applied Pesaran ARDL approach to investigate the impacts of public spending indicators on Nigerian economic growth, using annual time series data over the period 1981-2017. Empirical findings supported the significant negative impact of recurrent expenditures of government on economic growth, while the positive effect of capital expenditures was not significant. Leshoro (2017) also tested the relationship between the components of government spending and the real economic growth in South Africa using annual data over the period 1976-2015. Government spending was disaggregated into investment spending and consumption spending. The study used ARDL estimation method and found that both components of government spending have a significant positive impact on economic growth in the short run, while only the investment spending has a significant positive impact on such growth in the long run.

Recently, Onwuka (2021) has examined the relationship between disaggregated government expenditure and economic development in Nigeria using data for the period 1981-2020 and employing Vector Error Correction Model. The results revealed that government expenditure on social security, education, health and agriculture have a significant positive impact on economic

development of Nigeria, while government expenditure on infrastructure has a significant negative effect in the long run. Ayodele and Tomisin (2021) have also investigated the impact of disaggregated government expenditure and manufacturing sector performance on the economic performance of Nigeria employing data from 1981 to 2020 and ARDL estimation model. They found that manufacturing sector performance and government expenditure on community and social services have a significant positive impact on the economic performance, while government expenditure on economic services has a negative effect. They also applied several diagnostic tests to prove the robustness of their results. Kharel and Adhikari (2021) analyzed the effects of disaggregated government expenditure on economic growth of Nepal over the period 1990-2019 using two regression models. The estimation of the first model has shown a significant positive impact of both regular and miscellaneous public expenditure on economic growth, and insignificant effect of capital expenditure. Meanwhile, estimating the second model has highlighted the significant positive impact of education expenditure, and the insignificant effect of health care expenditure on the economic growth of Nepal.

In fact, few studies were conducted to examine government expenditures-economic growth nexus for Jordanian economy, such as Al-Fawwaz (2016). This study tested the effects of government expenditures and its disaggregated components on the economic growth of Jordan over the period 1980-2013. The study used multiple linear regression model estimated by applying ordinary least squares (OLS) model, and found that total and current government expenditures have significant positive effects on the Jordanian economy, while capital expenditures variable has insignificant positive effect. Al-Masaeed and Tsaregorodtsev (2018) examined the effects of several tools of fiscal policy beside other macroeconomic variables on the economic growth of Jordan during the period 1990-2010. They used multiple linear regression and applied OLS model for estimation. They found significant positive impacts for government expenditures, government revenues and exports on the Jordanian economy. Al-Tamimi (2020) explored the effects of government expenditures and tax revenues on the economic growth of Jordan during the period 2010-2019. The results of ARDL estimation method showed insignificant effects of both government spending and tax revenues as percentages of GDP on the Jordanian economy. He concluded that other variables affect the economy apart from tax revenues and government spending.

3. GOVERNMENT SPENDING IN JORDAN

Government spending is an important tool of fiscal policy, as it stimulates the economic growth through increasing the productivity of national production factors, especially if directed toward the highly effective economic sectors. In the early 1970s the Jordanian government adopted a balanced economic development strategy, as an attempt to enhance the economic growth of Jordan. Therefore, the government assigned the national planning commission to propose a series of successive ambitious economic development plans over the period 1973-1985. Unfortunately, these plans were proposed based on overoptimistic estimations, resulting in an

increased tendency of exaggerating government expenditure; the total government expenditures to GDP ratio continued to increase until it peaked at about 51.1% in 1979. The criticality of this phenomenon was materialized when the exaggerated government current expenditure couldn't be easily reduced afterwards. The optimal rate of government expenditure to GDP that maximizes the Jordanian economic growth was exceeded, exerting a negative impact on the economic growth (Adeinat, 2020).

The Jordanian government targeted the fiscal discipline through the approval of the third 5-year economic development plan proposed by the Ministry of Planning and International Cooperation during the period 1986-1990. However, the outcomes desired weren't met because of the lack of Arab countries financial aids to Jordan, the continuous decline in the growth rate of local revenues, the failure in reducing government spending that led to increases in both public debt and budget deficit, and the disability to meet external debt obligations. All these stressful circumstances resulted in the exchange rate crisis of 1989 that depreciated the Jordanian Dinar. Thus Jordan has asked for the financial support of IMF and World Bank and then has signed the first agreement with IMF that entailed the first financial and fiscal reform over the period 1989-1993 (Adeinat, 2020). Since 1989, Jordan became committed to several successive structural reforms as an attempt to achieve a sustained economic stabilization, through reducing government spending, eliminating subsidies on consumer goods and adjusting the tax structure toward indirect taxation (Mishal, 2019). (During the period from 2000 to 2008, Jordanian government spending was exaggerated coinciding with noticeable increases in the real economic growth. However, the adverse consequences of the global financial crisis of 2008 and the Arab Spring uprisings of 2011 have changed the whole scenery; in spite of the successive structural reforms over the periods 2008-2011 and 2012-2015, the government spending increased considerably in 2011 as a result of raising subsidies on consumer goods and energy. Consequently and in 2012, the government enforced strict austerity measures in order to control its expenditures. After all, these government efforts paid off when the government spending reduced considerably after 2014 (Adeinat, 2020).

Figure 1 below presents the behaviour of economic growth (%) and both capital and current government expenditures (as percentages

of GDP) in Jordan during the study period. At first glance, it can be seen that the ratio of current expenditure to GDP is much higher than that of capital expenditure during all the study period, and this is due to the inflated size of Jordanian government. Moreover, capital spending and economic growth have exhibited noticeable declines over the last few years especially after 2009 and the global financial crisis. The economic growth recorded its peak in 1992, and this was attributed to the return of Jordanian expats from Kuwait with their savings and compensations in addition to migration of wealthy Iraqi citizens to Jordan after the Iraqi invasion of Kuwait, as well as to the high increase in both government spending components in 1991.

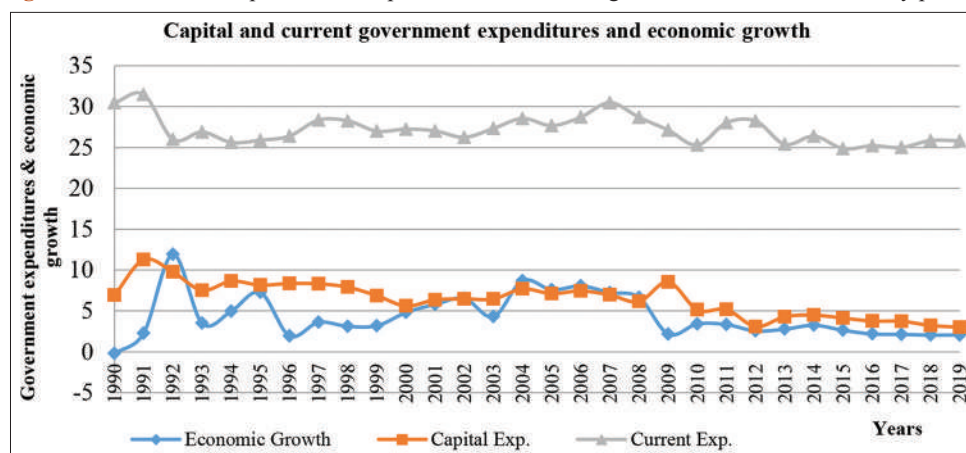
4. DATA, VARIABLES DESCRIPTION AND METHODOLOGY

The data used in this study was annual data and covered the period 1990-2019. The study period was dependent on data availability, noting that the year of 2020 was excluded from the sample to avoid the adverse consequences of COVID-19 on the economy. The data was extracted from bulletins and statistical reports issued by Department of Statistics and Central Bank of Jordan. Variables' description according to the literature and previous studies is as follows:

YG (dependent variable): The annual growth rate of real GDP as a proxy for economic growth which is defined as the percentage of annual change in the production of goods and services in the economy. Economic growth is influenced by various direct factors (such as human capital, natural resources and fixed capital formation), and indirect factors (such as institutions, public policies and the efficiency of financial system and government).

The independent or explanatory variables are: GFCF: Gross fixed capital formation to GDP ratio. It is a proxy for the value of acquisitions of fixed assets by the private sector, households and government less disposals of fixed assets. In other words, it is the value of net additions to capital stock. Economic theory and previous studies (Yousef and Warrad, 2020; Kandenge, 2006) confirmed that all countries need capital goods to replace

Figure 1: Government expenditure components and economic growth in Jordan over the study period.



Source: Researcher's calculations

obsolete assets that are used in production process, otherwise the production will decline. Therefore the expected sign for this variable is positive. LF: Labor force growth rate as a measure of the annual percentage change in labor force which is the number of people who are 16-years-old and above either employed or actively looking for work. The economic theory ensured the positive impact of labor force on the real output. However, some previous studies revealed contradictory or mixed results depending on the absorption capacity of labor markets. OT: Openness to trade as a proxy of public policies that invite international trade between countries. Trade openness is measured by the sum of exports and imports to GDP. According to economic theories, fewer restrictions on foreign trade can enhance economic growth and welfare, nevertheless, empirical studies showed mixed results regarding the impact of trade openness on economic growth (Razmi and Refaei, 2013; Yousef and Warrad, 2020). CURE: Current government expenditure that represents government consumption of final goods and services. It is measured by current government expenditure as a percentage of GDP. CAPE: Capital investment of government or capital government expenditure. It is measured by capital government expenditure as a percentage of GDP. According to Keynesian macroeconomic theory and endogenous economic growth models, both government expenditure components stimulate and enhance economic growth, whereas the classical economic theory has demonstrated the ineffectiveness of such expenditures in stimulating growth. In fact, the previous studies have revealed contradictory results as presented in the literature review above.

The study followed the approach of previous studies (Shahid et al., 2013; Razmi and Refaei, 2013; Yousef and Warrad, 2020; Al-Fawwaz, 2016; Al-Tamimi, 2020) that depended on Cobb-Douglas production function after taking the logarithm and then the time derivative of its both sides. This production function represents the relationship between the amounts of production factors and the amount of output produced by them. The econometric equation to be estimated in this study in order to examine the impact of government expenditure components on the economic growth of Jordan is expressed in the following form:

$$YG_t = \alpha_0 + \beta_1 GFCF_t + \beta_2 LF_t + \beta_3 OT_t + \beta_4 CAPE_t + \beta_5 CURE_t + \varepsilon_t \quad (1)$$

Where t represents the time or year, α_0 represents the intercept, ε_t represents the random error term, β_1 up to β_5 are the coefficients to be estimated, and the explanatory variables are described

above. Economic theories predict positive signs for β_1 up to β_3 , and positive or negative signs for β_4 and β_5 .

5. ECONOMETRIC RESULTS

The existence of unit root in the variables was tested using Augmented Dickey-Fuller (ADF) unit root test proposed by Dickey and Fuller (1979), in order to avoid the spurious regression caused by non-stationary variables. The results of this test are illustrated in Table 1 that clarifies the stationarity of current expenditure (CURE) and growth rate of both real GDP (YG) and labor force (LF). These variables are integrated of order zero $I(0)$, because the probability values are <0.05 at the level with constant and constant and trend, indicating the rejection of the null hypothesis of the existence of unit root at level. On the other hand, openness to trade (OT), gross fixed capital formation (GFCF) and capital expenditure (CAPE) are stationary at the first difference $I(1)$, because the probability values are <0.05 only at the first difference with constant and constant and trend, indicating the rejection of the null hypothesis of the existence of unit root at the first difference.

The study model was tested for the existence of cointegration between the study variables by applying Engle and Granger two-step cointegration test that confirmed the existence of cointegrated long-run relationship between these variables as presented in Table 2. The absolute value of ADF t-statistic on the residuals generated from OLS estimation is greater than all the absolute values of the test critical values, indicating the rejection of the null hypothesis of non-existence of cointegration.

Based on Akaike Information Criterion (AIC), the optimal lag number that is utilized in causality test and ARDL estimation method can be determined by using Vector Autoregressive approach. The result in Table 3 revealed that the optimal lag number is one.

Granger causality test proposed by Granger (1969) was also applied to recognize if any variable causes and predicts the others. The result of this test is displayed in Table 4 that showed the existence of unidirectional causality running from openness to trade (OT) and capital expenditure (CAPE) to economic growth (YG), because the probability values are $<5\%$ for the first and fifth null hypotheses, indicating the rejection of such hypotheses, while the probability values are more than 5% for the second and sixth null hypotheses, indicating the acceptance of these

Table 1: ADF test results

Variable	Level				First difference			
	Constant		Constant and trend		Constant		Constant and trend	
	t-statistic	Prob.	t-statistic	Prob.	t-statistic	Prob.	t-statistic	Prob.
YG	-3.8636	0.0066	-4.750	0.0037	-	-	-	-
GFCF	-0.6461	0.8444	-1.6949	0.7267	-4.297	0.0024	-4.316	0.0105
LF	-4.7613	0.0007	-4.9018	0.0026	-	-	-	-
OT	-0.9944	0.7412	-1.3761	0.8459	-4.333	0.0022	-4.3088	0.0107
CAPE	-1.3966	0.5689	-3.9154	0.0248	-7.672	0.0000	-7.5253	0.0000
CURE	-4.2570	0.0025	-4.1544	0.0147	-	-	-	-

Source: Researcher's calculations

hypotheses and the ability of both trade openness and capital expenditure to cause and predict changes in economic growth. Therefore, emphasis must be given to trade liberalization and capital government expenditure as they can cause real effects on the Jordanian economy. On the other hand, a bidirectional causality between current expenditure (CURE) and real GDP growth rate (YG) is found, because the probability values are <5% for the third and fourth null hypotheses, indicating the rejection of these hypotheses, and the ability of each variable to cause and predict the other.

The study variables are integrated of different orders [I(0) and I(1)], accordingly, the appropriate estimation method to be applied is FMOLS model proposed by Philips and Hansen (1990). Such model examines the dynamic interactions between the cointegrated variables and adjusts OLS in order to address autocorrelation and endogeneity of the explanatory variables (Philips, 1995). This model also has the ability to produce reliable estimates in a small sample size (Hargreaves, 1994). The results of FMOLS estimation are presented in Table 5, showing that all estimated coefficients are having the correct anticipated signs. There is a significant positive long-run relationship between capital expenditure (CAPE) and economic growth (YG), as a 1% increase in capital expenditure stimulates real GDP growth to increase by 0.68% in the long-run (at 1% significance level), which is in line with the Keynesian theory and endogenous growth models, and also consistent with the

outcomes of some previous studies such as (Wahab, 2011; Shahid et al., 2013; Alshahrani and Alsadiq, 2014; Leshoro, 2017). There is also a significant positive long-run relationship between gross fixed capital formation (GFCF), trade openness (OT) and economic growth, as a 1% increase in openness to trade (OT) increases real output by 0.17% in the long-run (at 1% significance level), implying the important role of trade liberalization in raising the economic welfare. In contrast, there is a significant negative long-run relationship between current expenditures (CURE) and economic growth, since 1% increase in current expenditures induces real output to decline by approximately 0.88% in the long-run (at 5% significance level), which is consistent with the outcomes of some previous studies such as (Barro, 1991; Onifade et al., 2020). Labor force (LF) has insignificant impact on the real output of Jordan during the study period. The coefficient of determination (R-squared) indicates that only 66% of the total variation in the economic growth is explained by the estimated model, and this result is attributed to using growth rate of the dependent variable instead of its level value. Some diagnostics tests for FMOLS estimation results were implemented; Table 6 demonstrates the non-existence of multicollinearity problem since all the values of Centered Variance Inflation Factor (VIF) are <10. Furthermore, to ensure the reliability of estimation results, Jarque-Bera normality test was implemented as clear in Figure 2, where the probability value (0.574) is >0.05 (insignificant), indicating the acceptance of the null hypothesis of the normal distribution of sample data.

Table 2: Engle and Granger cointegration test

	t-Statistic	Prob.*
ADF test statistic	-2.7973	0.0069
Test critical values		
1% level	-2.6501	
5% level	-1.9534	
10% level	-1.6098	

Source: Researcher’s calculations. *MacKinnon (1996) one-sided P-values. Null Hypothesis: Residuals from OLS estimation have a unit root (no cointegration).

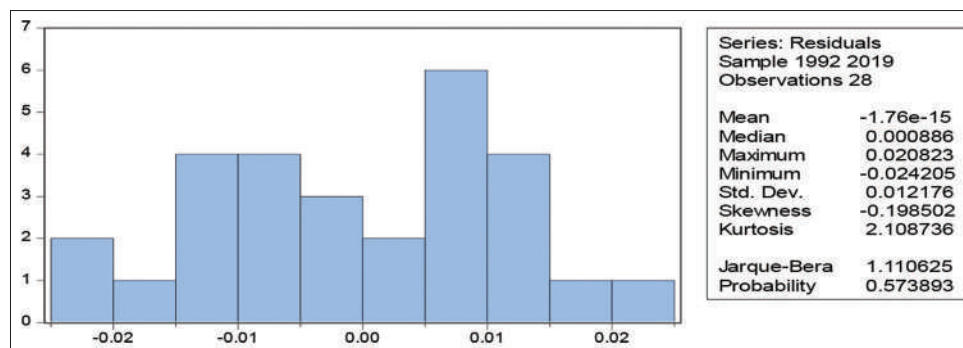
For more results’ robustness, the study model was re-estimated by ARDL model that generates short and long run coefficients. This study is interested in long run relationships, therefore, only the long run coefficients of ARDL Cointegrating approach are presented in Table 7. The results in this table are mostly consistent with the outcomes of FMOLS estimation in terms of signs and significance, since gross fixed capital formation, trade openness

Table 3: The selection of optimal lag number

Lag	LogL	LR	FPE	AIC	SC	HQ
0	301.7983	NA	1.95e-16	-21.9851	-21.7451	-21.9137
1	368.3538	103.5307*	9.31e-18*	-25.0632*	-23.6234*	-24.6351*
2	391.9895	28.0128	1.28e-17	-24.9622	-22.3225	-24.1773

Source: Researcher’s calculations. *Indicates the optimal number of lags. LR: Sequential modified LR test statistic, FPE: Final Prediction Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion, HQ: Hannan-Quinn information criterion

Figure 2: Jarque-Bera normality test result.



Source: Researcher’s calculations

Table 4: Results of Granger causality test

Null hypotheses	F-Statistic	P-value
1. IOT does not Granger cause YG	5.5853	0.0262
2. YG does not Granger cause OT	3.9254	0.0587
3. CURE does not Granger cause YG	11.7668	0.0021
4. YG does not Granger cause CURE	5.0824	0.0332
5. CAPE does not Granger cause YG	8.4894	0.0074
6. YG does not Granger cause CAPE	0.9121	0.3487

Source: Researcher's calculations

Table 5: FMOLS estimation results

Dependent variable: Real GDP growth rate (YG)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF	0.3735	0.1239	3.0136	0.0064
LF	0.0549	0.1796	0.3054	0.7630
OT	0.1728	0.0370	4.6699	0.0001
CAPE	0.6813	0.2193	3.1071	0.0051
CURE	-0.8763	0.3145	-2.7862	0.0108
C	0.1236	0.0669	1.8488	0.0780

R-squared=0.66, Adjusted R-squared=0.58. Source: Researcher's calculations

Table 6: VIF results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
GFCF	0.0154	117.5217	5.4969
LF	0.0323	8.8851	1.8781
OT	0.0014	241.8191	4.9446
CAPE	0.0481	25.5024	2.1961
CURE	0.0989	900.3188	2.3126
C	0.0045	560.5344	NA

Source: Researcher's calculations

Table 7: ARDL cointegrating and long run form

Long Run Coefficients				
Dependent Variable: Economic growth YG				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF	0.2055	0.0839	2.4489	0.0281
LF	0.3769	0.1630	2.3119	0.0365
OT	0.3426	0.1245	2.7508	0.0156
CAPE	0.6694	0.2181	3.0701	0.0083
CURE	0.3009	0.3186	0.9443	0.3610
C	-0.1179	0.0697	-1.6919	0.1128
CointEq(-1)	-0.9493	0.1276	-7.4348	0.0000
R-squared: 0.87		Adjusted R-squared: 0.76	Durbin-Watson stat: 2.0512	
F-statistic: 7.8698		Prob (F-statistic): 0.0002		

Source: Researcher's calculations

Table 8: ARDL bounds cointegration test

Test Statistic	Value
F-statistic	6.8040
Critical Value Bounds	
Significance	I1 bound
10%	2.26
5%	2.62
1%	3.41
	I1 bound
10%	3.35
5%	3.79
1%	4.68

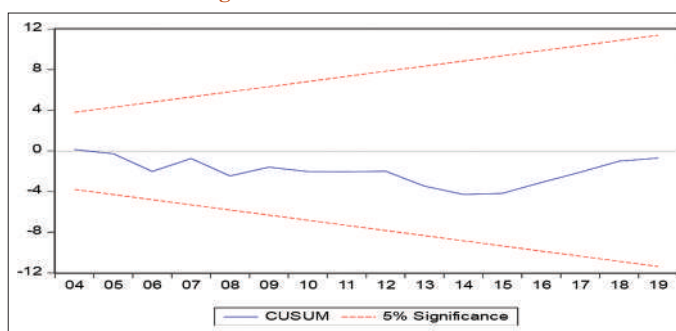
Source: Researcher's calculations

Table 9: Residual tests

Test	Statistics	Prob.	Null hypothesis
Breusch-Godfrey serial correlation LM test	1.5796	0.2432	No serial correlation
Jarque-Bera normality test	0.9122	0.6337	Normal distribution
Breusch-Pagan-Godfrey heteroskedasticity test	2.4788	0.0530	No heteroskedasticity

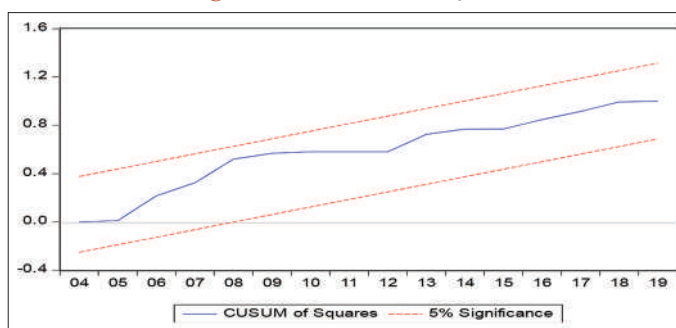
Source: Calculated by researcher

Figure 3: Plot of CUSUM test.



Source: Prepared by researcher

Figure 4: Plot of CUSUMQ test.



Source: Prepared by researcher

and capital expenditure have a significant positive long-run impact on economic growth in both estimation methods, whereas current expenditure has insignificant effect in ARDL estimation. The coefficient of error correction term (-0.9493) is statistically significant at 1% significance level (with the anticipated negative sign), meaning that the equilibrium long-run relationship is existed, where about 95% of the disequilibrium of economic growth by a shock in the previous year would be adjusted back to the long-run equilibrium in the current year. The coefficient of determination (R-squared) indicates that 87% of the variation in the economic growth is explained by the estimated model. Moreover, the probability of F-statistic (0.0002) confirms the significance of the model and its goodness of fit. Furthermore,

ARDL Bounds Cointegration test was applied with results illustrated in Table 8 that confirms the existence of cointegrated long-run relationship between the study variables. As clear in this table, the value of calculated F-statistics (6.8040) is greater than all critical values for I1 bound, concluding the rejection of the null hypothesis of non-existence of cointegration.

The parameters stability and changes in data structure were tested through Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) tests proposed by Borensztein et al. (1998), with results depicted in Figures 3 and 4. The line chart for both tests lies within the two

red lines that represent the critical bounds at 5% significance level, indicating the stability of the estimated parameters as well as the non-existence of structural break. Some residual tests were also conducted with results displayed in Table 9. As shown in this table, all probability values for all tests are >0.05 (insignificant), indicating the acceptance of all null hypotheses mentioned in that table.

6. CONCLUSIONS AND RECOMMENDATIONS

The main goal of this study was to examine the impact of disaggregated government expenditures and other macroeconomic variables on the economic growth of Jordan during the period 1990-2019. The study applied Granger causality test and two estimation methods for more robustness check and inferred the following conclusions:

1. There is a significant long run impact for both government expenditure components on the economic growth of Jordan during the study period.
2. The humongous current expenditure of the Jordanian government cannot sustain the economic growth in the long run, since such expenditure may have a significant negative impact on the Jordanian economy.
3. The ability of both trade liberalization and government expenditure components to cause and predict changes in real economic growth necessitates more emphasis to be given to those variables as they can cause real effects on the Jordanian economy.

Based on the previous econometric analysis, the following recommendations are drawn up:

1. Government has to reduce its current expenditure and increase its productive investments (health care, education, roads...etc.) through obtaining funds with the lowest cost, and reducing waste resulted from inefficient allocation of resources.
2. Government should ensure that the share of current expenditure in total public expenditures is kept within a reasonable proportion by blocking wastages or leakages in public finance. In order to cut down the high cost of governance and increase the share of capital expenditure in total expenditures, some procedures must be implemented such as: (a) Merging of some public agencies and departments that have similar functions. (b) Reviewing the disproportionate bonuses, rewards or emoluments given to political public officers.
3. Government must really fight against the financial corruption and the diversion of public funds allocated for the execution of capital or investment projects.
4. Government has to facilitate international trade that allows transition of new knowledge and leading technologies, increases labor and capital productivities, and encourages international competition, avoiding the reliance on exporting natural raw materials. Moreover, an increase in exports (of final goods rather than intermediate ones) results in an increase in foreign currencies, enhances the purchasing power of Jordanian currency and hence the real economic growth.

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