

Building a Model of Government Spending Using Autoregressive Distributed Lag (ARDL) Analysis from 2001 to 2019: A Case Study of Jordan

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Abstract

The study aims to build a model of government spending in Jordan using ARDL analysis through the use of an E-views program by determining the relationships between government spending and variables, such as the gross domestic product (GDP), government revenues, economic openness (OP), inflation rate, unemployment, population growth rate, and public debt. The statistical analysis showed a significant positive relationship between government spending and (GDP) and government revenues. It revealed significant positive relationships between government spending and (OP) and inflation. It found the statistically significant negative effect of the unemployment rate and the population growth rate on government spending. A negative relationship was found between government spending lag (1) and current government spending. Public debt was found to have a positive but not statistically significant effect on government spending. The relationships between the dependent variable and independent variables of government spending were consistent with unrestricted ARDL analysis in the long term. The analysis showed a statistically significant positive relationship between government spending and GDP at a short-term level but a statistically significant negative relationship between government spending and independent variables, such as population growth rate, inflation rate, and unemployment rate at a short-term level. One of the most important recommendations of the study was working to increase government spending in a way that is compatible with the increasing population growth. The study recommends government intervention to bring in more revenue through income-generating economic activities.

Contribution / Originality: This will be one of the few studies to build a model of government spending using Autonomous Distributed Regression (ARDL). The study also provides a scientific addition in the field of financial and economic sciences from a scientific point of view through the use of different statistical methods using ARDL analysis on the long and short levels to assist the government in preparing the state's general budget. The study also helps the government to develop in the field of public finances and prepare an unconventional general budget.

Keywords: government spending, government revenue, the public budget, fiscal policy

1. Introduction

Government spending receives great attention from researchers. It is an important part of the country, especially in developing countries. It is affected by many economic variables and is one of the financial policy tools that a state uses to influence economic activity and achieve the desired goals. This study discusses the situation of Jordan as a developing country that works to increase government spending continuously, which increases its public budget deficit.

Many studies have dealt with gross domestic product (GDP), unemployment, inflation, and population as determinants of government spending. Some studies have also dealt with public revenues, economic openness (OP), and public debt. This study considers all these factors to build a model of government spending in Jordan. The GDP, local revenue, OP, inflation, unemployment, population growth, and public debt are among the important variables specified for government public expenditures. These variables are characterized by a reciprocal relationship with government public expenditures through the influence of variables on public expenditures. Several studies were presented to analyze the impact of population, GDP, and government

revenues on government spending.

This study builds a model of government spending by aggregating all factors that affect government spending in addition to factors, such as inflation, unemployment, public debt, and OP, whose impact varies from one country to another according to the nature and structure of the country's economy. Long- and short-term ARDL analysis is used to obtain the results and recommendations for the assistance of financial decision-makers in Jordan and determine the trends of public financial policy in the country and the ability to reduce and control government spending and reduce public budget deficit. The study is based on unrestricted ARDAL analysis through OLS analysis, whereby the hypotheses of the study is tested based on them. Long- and short-term analyses are performed using ARDAL analysis.

1.1 Problem of the Study

The problem of this study comes from the increase in government spending in Jordan. This increase leads to an increase in public budget deficit, which most developing economies suffer from. Research must be found to find solutions to this problem, which is one of the main problems in the Jordanian economy that lead to economic imbalances and large gaps in the Jordanian public budget. This study attempts to clarify the relationship between public expenditures and their determinants, such as GDP, government revenue, OP, inflation, unemployment, population growth, and public debt through appropriate analysis that highlights the impact. The study is based on unrestricted ARDAL analysis through OLS analysis, whereby the hypotheses are tested based on them. Then, long- and short-term analyses are performed using ARDAL analysis. The study problem can be identified through the following question:

- 1- What is the effect of the GDP on government spending in Jordan?
- What is the effect of public revenues on government spending in Jordan in?
- 3- What is the effect of economic openness on government spending in Jordan?
- 4- What is the effect of inflation on government spending in Jordan?
- 5- What is the effect of unemployment on government spending in Jordan?
- 6- What is the effect of population growth on government spending in Jordan?
- 7- What is the effect of public debt on government spending in Jordan?
- 8- What is the effect of government spending (t-1) on government spending (t) in Jordan

1.2 Importance of the Study

The importance of the study comes in two aspects, which are the scientific and practical importance. The scientific importance of the study comes as it sheds light on one important topic that uses modern tools in the field of standard analysis. The practical importance comes through following an accurate model that builds the relationship and shows the nature of the long- and short-term relationships among public expenditures, GDP, local revenues, inflation, unemployment, population, and public debt. These relationships can be clarified through ARDL analysis. This study is useful in determining the nature and direction of the relationship between government spending and its determinants and helps in understanding the behavior of the variables under study in the long and short term. This study is important in obtaining accurate results to help decision makers in fiscal policy in light of the financial conditions that the country suffers due to the deficit in the public budget.

1.3 Objectives of the Study

The study aims to build an accurate model in determining the nature of the relationship between government spending and its determinants using the modern methodology of time series analysis using ARDL analysis. The analysis reveals the relationship and balanced stability in the long and short term. The study also aims to clarify the development of government spending and its determinants in Jordan during the study years.

1.4 Study Hypotheses

By looking at previous studies on the study variables, the study hypotheses are formulated as follows:

- 1- There is a statistically significant positive relationship at the level of (α 0.05) between GDP and government spending.
- 2- There is a statistically significant positive relationship at the level of (α 0.05) between government revenue and government spending.
- 3- There is a statistically significant positive relationship at the level of (α 0.05) between economic openness and government spending.

- 4- There is a statistically significant positive relationship at the level of (α 0.05) inflation rate and government spending.
- 5- There is a statistically significant positive relationship at the level of (α 0.05) Unemployment rate and government spending.
- 6 - There is a statistically significant positive relationship at the level of (α 0.05) Population growth rate and government spending.
- 7- There is a statistically significant positive relationship at the level of (α 0.05) Public debt and government spending.
- 8- There is a statistically significant positive relationship at the level of (α 0.05) between government spending (t-1) and government spending in year (t).

1.5 Methodology

This study adopts the descriptive analytical approach. Data and concepts related to the study variables are obtained through the websites of the Central Bank and the Department of Statistics for the purpose of statistical analysis. The E-views program is used in ARDL analysis, which uses long- and short-term analyses of the study variables.

1.6 Added Value of the Study

To the best of the researcher's knowledge, this study is the first to build a model of government spending in Jordan using ARDL analysis and the E-views program to obtain results in the long and short term.

1.7 Study Limitations

The case study is on Jordan from 2001 to 2019.

2. Theoretical Aspect and Previous Studies

Many studies on the determinants of government expenditures are found.

Al-Hijaya (2018) aimed to explain the determinants of government spending in Lebanon, Egypt, Morocco, and Tunisia. The study used the analysis of the stability of the study variables, the joint integration, and the regression analysis using OLS. The study relied on many variables. The most prominent results of the study were that no relationship exists between government spending and economic growth; a positive relationship exists among government spending, public revenues, and population growth; and inflation and the ratio of public debt to GDP have a negative effect on government spending in these countries. One of the most important recommendations of the study is to work to support local financial resources by searching for new financial alternatives, controlling the operating expenses of government departments, and merging some institutions with similar tasks.

Nayef (2010) aimed to analyze the determinants of government spending in Syria. The study relied on the GDP, inflation, population, degree of urbanization, and OP. The study used the joint integration test, the error correction model, and the causal relationship. The most important results of the analysis were the existence of three common integration relationships between the study variables. The results of the study showed that the GDP, urbanization, and inflation have a positive relationship with spending. The causality test showed that the population causes government spending. The results of the study showed a long-term balanced relationship between the variables of the study. One of the most important recommendations of the study was to adopt more important allocations for government spending to develop infrastructure services and maintain the average per capita share of goods and services.

Jibir and Aluthge (2019) aimed to determine the factors affecting government spending. Some variables used were oil revenue, GDP, population, trade openness, oil prices, taxes, and inflation. The study used the ARDL model for data analysis, which showed that the study variables, namely, oil revenue, GDP, population, trade openness, oil prices, and inflation, have a positive effect in the long- and short-term on government spending. Public debt has a negative impact on government spending in the long- and short-term. The standard analysis showed that all the variables used are important determinants of government spending in Nigeria. Accordingly, the study recommended the necessity of diversifying revenues instead of relying on the oil sector and strengthening fiscal and monetary policy to ensure stability in prices and exchange rates.

Ekpung (2014) aimed to estimate the determinants of government spending in Nigeria from 1970 to 2010. The statistical analysis of the study showed that the rate of urbanization, government revenue, population density, external reserves, and type of government collectively or individually affect government spending. The analysis

also showed that government spending affects the infrastructure in Nigeria. One of the most important recommendations of the study was the need to monitor government spending on infrastructure and strict adherence to tax policy.

Gachunga's (2019) study aimed to analyze determinants of government spending in from 1970 to 2017 through ARDL analysis. The analysis showed that GDP, population, inflation, and trade openness are important determinants of the positive impact on government spending in Kenya. One of the most important recommendations of the study was the necessity to strengthen the fiscal and tax policy and the guarantee and stability policy at the price and exchange rate levels.

Abu Tayeh, R. Mairna, and H. Mustafa (2011) aimed to study the determinants of government spending in Jordan. The study relied on unemployment and inflation variables and the population where the analysis was relied upon through the correlation between the variables. The results of the study showed a positive relationship between government spending and unemployment. The correlation analysis showed a positive relationship between public spending and inflation. The analysis showed a negative relationship between government spending and the population. This relationship is caused by economic problems and the budget deficit. The most important recommendations of the study are the need to strengthen and support the infrastructure of the economy and enhance private investment and the role of human resources in the economy of Jordan. This study was based on an analysis using the simple correlation coefficient because it did not take on other variables, such as GDP, local revenues, public debt, and inflation rate.

Maluleke (2017) based her study on a review of empirical studies conducted on the determinants of government spending. The study concluded that the determinants of government spending, as with many experimental studies, are economic growth, revenues, urbanization, and commercial openness, which have a significant positive impact on government spending. The determinants of spending differ from one country to another in terms of impact. Sometimes, they are negative in one country and positive in another country. For this reason, the appropriate statistical methodology must be used to obtain the best results.

Some studies have presented the effect of spending on some economic variables and showed the importance of spending as an independent variable on economic growth and services, such as education and health.

Monojit, Sushil and Sayantan (2015) aimed to discuss the impact of government spending on education from 2001 to 2010. The analysis revealed that richer regions spend more on education than poorer regions, tax revenues and grants provided by the government positively affect spending on education, and political factors and corruption do not affect education spending in India. The most important recommendation is the need to increase spending on education and educational infrastructure.

Bose R. Osborn S. (2007) aimed to estimate the impact of government spending on economic growth and the education sector in 30 developing countries. The analysis clarified the effect of government spending on education to increase economic growth. The analysis also showed a positive effect of capital government spending on economic growth, whereas the current spending does not have an impact on growth. The most important recommendation of the study was the necessity of increasing public and capital spending to increase economic growth.

Amir, and Shabbir (2017) aimed to measure the effect of spending on economic growth. The analysis showed positive relationships between government spending and growth and health but showed negative relationships between government spending and defense, education, and economic growth. One of the most important recommendations of the study is that spending should be used appropriately and accurately to influence the economy and growth.

Nganyi, Jagongo, and Atheru (2019) aimed to control and plan government spending by evaluating capital projects that the Kenyan government spends on. This study found that planning, management, and accountability for spending have major roles in controlling government public expenditures on government projects. The most important recommendation of the study was the need to strengthen the role of planning and controlling government spending and to strengthen the partnership between the public and private sectors to advance the national economy.

Qadduri (2015) showed that government spending plays an important role in the economic activity in Algeria. Statistical analysis showed a positive relationship between government spending and economic growth in Algeria. The study recommended that spending should be directed toward areas that serve economic development, such as spending on health and education and building an infrastructure base.

Some studies on tax collection in achieving government spending efficiency are found.

Afonso, Jalles, and Venâncio (2019) aimed to analyze the relationship between taxes and the efficiency of government spending in the economies of developed countries. The study studied 32 countries from 2003 to 2017. The analysis showed a negative relationship between the efficiency of government spending and taxes, especially direct and indirect taxes. One of the most important recommendations of the study was the necessity to pay attention to the information necessary especially when estimating the state's general budget and tax structure to suit government spending.

Lojanica (2013) aims to analyze the relationship between government revenue and government spending in the Republic of Serbia. The study used ARDL analysis and analyzed the causal relationship between revenue and government spending. The study found a positive relationship between government revenue and spending, which means that the government increases government spending to increase taxes. This increase would destroy the economy. Thus, one of the most important recommendations of the study was to reduce government spending, which would in turn reduce the government's budget deficit.

2.1 Study Feature

The present study investigates the long- and short-term relationship of the determinants of government spending. This study found previous studies focusing on the relationship between government spending and some variables, such as population, OP, population growth, and public debt. This study took all the determinants of government spending, such as the GDP, government revenue, OP, inflation, unemployment, public debt, and population, to build a model of government spending in Jordan. The statistical methods used in this study are long- and short-term through the use of ARDL analysis.

3. Study Model



4. Theoretical Framework

4.1 Descriptive Analysis of the Study Variables

Before starting the data analysis, examining the descriptive statistics of the variables and the historical development of time series of the variables and their trends during the study period are necessary. Table 1 reflects the descriptive analysis of the variables during the study period (2001-2019).

Table (1) shows that the highest value of the government spending variable amounted to 8567.300 (MDJ) in 2019, whereas the lowest value was 1970.1 (MDJ) in 2001. Therefore, government spending in Jordan almost quadrupled with an estimated rate of 77% during the study period because of the increased current expenditures, which includes spending on salaries, wages, bonuses, and operating and transfer costs for ministries and public institutions in other executive bodies of the National Authority in Jordan, which constitutes 85% compared with 15% for capital expenditure (<http://alrai.com/article/10512648>).

For the determinants of government spending, the GDP reached a minimum of 5998.600 (MJD) in 2001. In 2019, the highest value reached 29984.20 (MDJ). The GDP multiplied by four times and increased by 79% during the study period, which was caused by the increase in spending on the components of the GDP, especially the total

consumption, which constitutes a high percentage in Jordan.

The local government revenue constituted a large percentage of taxes, which reached a minimum value of 1610.10 (MJD) and the highest value of 6944 (MDJ), which doubled by an average of 77% during the study period due to the government policy in collecting taxes and raising income and sales taxes in the last years of the study. OP plays an important role in increasing spending. If Jordan is considered an importer and not a source of goods and services, OP will lead to an increase in imports of goods and services. It reached the lowest value of 63% in 2019 and its highest value of 1.12 in 2006.

Inflation in Jordan reached its lowest percentage (-88%) in 2016. It had a high level of 13.9% in 2009. This fluctuation is because inflation in Jordan is imported and is greatly affected by fluctuation in the prices of oil, goods, and services abroad.

The lowest unemployment rate was 11.9% in 2015. The unemployment rate increased to 18.6% at the end of the study period in 2019 because of the economic problems afflicting the country.

Population growth also plays an important role in the economies of countries. Spending is increased on health, education, and other services whenever the population growth rate increases. However, this effect varies from country to country according to the economic resources of the government budget. Jordan is considered among developing countries with few financial resources available for the public budget, which is mainly dependent on taxes. The population growth in Jordan is considered abnormal due to immigration and asylum from neighboring Arab countries to Jordan. Its population growth increased significantly, which increased pressure on the budget with limited resources.

Table 1 shows that the population growth rate in Jordan reached its highest of 8.4% in 2014 as a result of migration from neighboring Arab countries to Jordan due to political and economic turmoil in neighboring Arab countries, especially Syria. This increase in population growth increased government spending. The lowest population growth rate in Jordan was 2.3% in 2003.

With regard to public debt, we found that the highest value of debt in Jordan amounted to 2692.70 (MDJ) in 2003. The lowest value of public debt was 6278.5 (MDJ) in 2019. Jordan continuously worked to reduce public debt throughout the study period to lessen the burden that is destroying the national economy.

Table 1. Descriptive analysis of all study variables

The variable	EX	GDP	TR	OP	INF	UNM	GPOP	TB
Mean	5335.711	16932.70	4050.805	0.848125	3.464737	13.97368	0.039891	13766.45
Maximum	8567.300	29984.20	6944.900	1.121864	13.90000	18.60000	0.084668	26092.70
Minimum	1970.100	5998.600	1610.100	0.636826	-0.880000	11.90000	0.023539	6278.500
Std. Dev.	2342.888	8510.082	1803.569	0.147978	3.368677	1.893217	0.021473	7093.950
Observations	19	19	19	19	19	19	19	19

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

4.2 Analysis of the Simple Correlation between Variables

Table 2 shows that the correlation coefficient is positive among the rate of spending growth, the rate of GDP growth, the rate of revenue growth, OP, inflation, and public debt, whereas the coefficient of correlation is negative between government spending and the unemployment rate. Therefore, the decrease in the unemployment rate leads to an increase in the rate of growth of government spending. A negative correlation is observed between the rate of growth of government spending and the rate of population growth due to economic problems, limited resources, and the public budget deficit in Jordan.

Table 2. Analysis of the simple correlation between variables

GEX	GGDP	GTR	OP	INF	UNM	GPOP	TB
	63%	50%	62%	41%	-18%	-7.5%	25%

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

4.3 Evolution of Study Variables

Figure 1 includes the historical path for the volume of government spending during the study period in Jordan. The volume of government spending increased from 1970.1 (MJD) in 2001 to 6030.5 (MJD) in 2010. This increase was because of the increased government employment, which led to an increase in current spending and government spending on health, education, and other social services, which in turn led to an increase in capital spending. Compared with the government spending in 2010, government spending decreased to 5708.0 (MJD) in 2011 because of the government's measures to control current and capital expenditures to reduce the public budget deficit. Government spending later increased until it reached 8567 (MJD) in 2019.

Figure 1 shows that the development of the size of the GDP increased significantly and continuously during the study period until it reached 29984 (MJD) in 2019.

The Form also shows that the volume of local public revenues in general began to increase but was fluctuating. It decreased in 2004 compared with that in 2010, 2002, and 2003. It began to rise until it reached 4375 (MJD) in 2009 and then fluctuated until it reached 6945 (MJD) in 2019. The fluctuation is because of the limited resources and dependence on taxes as a main source of local public revenues in Jordan, which decrease and increase from one year to the next according to the economic activity and tax collection efficiency.

The Form shows that the rate of (OP) started to rise but was fluctuating from 2000. It continued to increase in 2006 and then decreased from the beginning of 2007 to 2010. Then, it increased in 2011 and 2012 but continuously declined until 2019 when the rate of OP was 64%.

The inflation rates (INF) in Jordan in general started to rise and fall. They continued to rise until they reached 13.9% in 2009 and were considered the highest rates of inflation during the study period. They suddenly decreased in 2010 to -070%. They started to fluctuate until the end of the study period because inflation in Jordan is imported. High international prices, especially the prices of oil, fluctuate significantly, which leads to fluctuation in inflation.

Figure 1 shows that the unemployment rate (the United Nations Mission in Jordan) fluctuated from the beginning of the period until mid-2015. It increased to high rates until 2019, when the ratio reached 18.6% due to economic problems and population migration to Jordan. Jordan increased unemployment significantly and decreased government employment in recent years.

The population growth rate fluctuated in Jordan. In 2005, it rose to 6.6% because of stability, which led to the emigration from some Arab countries to Jordan. Then, it decreased in 2006 to 2.8% and continued with a natural growth rate. It later increased significantly to 8.5%, 7.8%, and 7.9% in 2014, 2015, and 2016, respectively, as a result of asylum by some Arab countries to Jordan. The natural growth continued until it reached 2.5% in 2019.

Figure 1 shows that the historical path of public debt continued to decline until the end of the study because of the measures taken by the Jordanian government to work on economic correction and public debt reduction. The government relied on local resources. It also reduced the burden on the public debt, which consumes the economy.

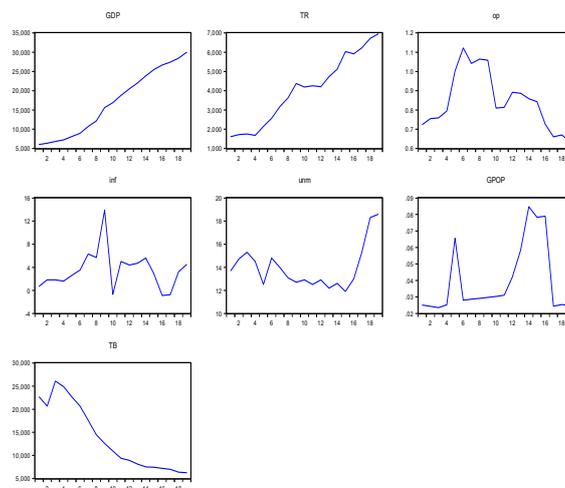


Figure 1. The evolution of the study variables during the study period

Source prepared by the researcher using the program E-views based on study data in Appendix 1.

4.5 Theoretical Relationship between the Study Variables

This study is based on variables of previous studies that determine government spending, such as the GDP, tax revenue, Economic openness (OP) inflation, unemployment, and public debt. Several studies that were clarified in this study showed positive relationships between government spending and GDP, OP, government revenue, and inflation.

Adamu Jibir and Chandana Aluthge (2019), Muhia John Gachunga (2019) and Nemanja Lojanica (2013) showed a positive relationship between government spending and government revenues.

Maluleke (2017) showed that many experimental studies conducted in many countries revealed the positive impact of government revenues, economic growth, and OP on government spending. The study showed that the impact of other spending determinants differs from one country to another, that is, the impact is sometimes negative in one country and positive in another country, because of the different nature of the economic structure, economic problems, and economic imbalances in different countries. Adamu Jibir and Chandana Aluthge (2019) showed a positive relationship between inflation and government spending and a negative relationship between public debt and government spending. Muhia John Gachunga (2019) also showed a positive relationship between inflation and government spending and the absence of a relationship between public debt and government spending in Kenya because public debt is used to bridge the deficit in the public.

The first to link between population growth and government spending is found in Wagner (1883) (Muhia John Gachunga, 2019). Some studies also showed a positive relationship between population growth and government spending (e.g., Salim Al-Hijaya, 2018). Sultan N. Abu Tayeh, R. Mirna, and H. Mustafa (2011) studied the determinants of public expenditures in Jordan. The study showed a negative relationship between government spending and population, which was justified by economic problems and deficits in the Jordanian economy.

This review of literature on the relationship between the determinants of government spending revealed that studies that take variables, such as GDP, population growth, and government revenue, to influence government spending focused on public debt and unemployment. The results of inflation and OP were different and varied from one country to another according to the economic nature of the country and the economic problems and economic imbalances experienced by the state. Therefore, the present study considers all these variables in influencing government spending in Jordan and knowing which variables are more affected by the use of long- and short-term analysis using ARDL analysis.

6. Study Hypotheses Test

This study is based on unrestricted ARDAL analysis through OLS analysis. The hypotheses of the study are tested based on them. Then, long- and short-term analyses are performed through the use of ARDAL analysis.

This study uses ARDL analysis and the E-views program to study the effect of independent variables on government spending in Jordan.

This type of model is called the ARDL model, and this method is based on unrestricted error assessment. This method is distinguished from the traditional type of full technologies incorporated as follows (Ali Abdel-Zahra Hassan & Abdel-Latif Hassan Shoman, 2013):

- 1- Explanatory and multiple variables are distinguished.
- 2- Short- and long-range vehicles can be rated simultaneously and in the same model.
- 3- It helps to eliminate problems related to deleting variables and problems of self-correlation.
- 4- The capabilities resulting from this method are unbiased and effective because they contribute to preventing self-association.
- 5- It can be applied if the sample size is small, and this application is in contrast to most traditional joint integrity tests that require the sample size to be large for the results to be efficient.

One of the conditions for an ARDL analysis test is that the dependent variable stabilized at the first degree, so from a table (4) shows that the government spending variable stabilized at the first degree, while table (3) shows that it was unstable at the level.

Table 3. Summary of the stability test of the variables

Null Hypothesis: EX has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.459258	0.8783
Test critical values: 1% level	-3.857386	
5% level	-3.040391	
10% level	-2.660551	

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

Table 4. The variable of government spending stabilized at the first degree

Null Hypothesis: D(EX) has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.124490	0.0009
Test critical values: 1% level	-3.886751	
5% level	-3.052169	
10% level	-2.666593	

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

In order to test the study hypotheses, the following model was built.

$$EX = f(EX(-1), GDP, TR, OP, INF, UNM, GPOP, TB)$$

Whereas:

EX: The volume of government spending (MDJ) during the study period.

EX-1: The volume of government spending (MDJ) during the period of t-1.

GDP: Jordan's GDP in millions of dinars during the study period.

TR: Public revenues in Jordan, in millions of dinars during the study period.

OP: economic openness during the study period.

INF: inflation rate in Jordan during the study period.

UNM: Unemployment rate in Jordan during the study period.

GPOP: percentage of population growth in Jordan during the study period.

TB: The size of the public debt in million dinars in Jordan during the study period.

Table 5. Dependent variable (Method: ARDL)

Variable	Coefficient	t-Statistic	Prob.
EX(-1)	-0.398615	-8.969933	0.0003
GDP	0.244998	4.617693	0.0057
GDP(-1)	0.152170	2.910690	0.0334
TR	0.165001	3.975969	0.0106
OP	1478.166	11.54134	0.0001
INF	-10.68749	-1.094169	0.3238
INF(-1)	48.93536	13.39078	0.0000
UNM	-153.5367	-10.72869	0.0001
UNM(-1)	-56.22986	-4.032607	0.0100
GPOP	-9174.867	-11.25485	0.0001
GPOP(-1)	-8603.904	-8.794423	0.0003
TB	0.013614	1.680131	0.1538

Source prepared by the researcher using the program E-views based on study data in Appendix (1)

R- Squared: 99%.

Adjusted R- Squared: 99%.

F-Statistic: 6169.295; Prob(F-statistic): 0.00;

Durbin-Watson stat: 2.67.

The following model was built to test the study hypotheses. The model shows the coefficient of determination (modified R squared 99%), which means that changes in the independent variables explained approximately 99% of the changes in the dependent variable. The value of F-statistic reaches 6169.295, and the significance level is zero, which means that the model is statistically significant. The Durbin-Watson coefficient was 2.67, indicating that the model is appropriate and statistically significant, and judging the existence of a self-correlation problem or systematic error is not possible.

Can test the feasibility of the model and its ability to predict government expenditure in Jordan using the dispersion factor criterion (contrast ratio), as shown in Form 3. The researcher performed some standardized tests to ensure reliability, stability, and feasibility (validity test). Form 2 indicates that the bias values (bias ratio) are zero. The dispersion coefficient (the ratio of variance) is zero, and the value of the common variance is 99%. The random errors in the model show that the predictive power of the government spending model in Jordan is acceptable.

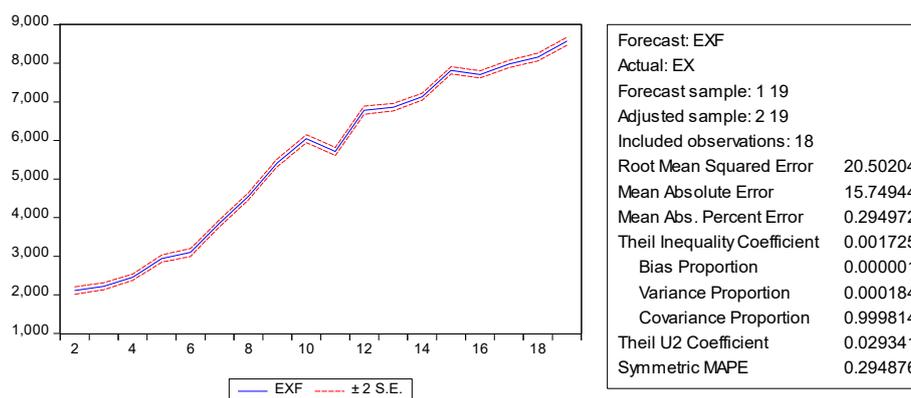


Figure 2. Test the predictability of the model

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

The first hypothesis: A statistically significant positive relationship exists at the level of $\alpha = 0.05$ between GDP and government spending.

The standard analysis in table 5 showed that the estimated coefficient to GDP is equal to 24%, which is a positive signal and means that the relationship between the change in GDP and the change in government spending is positive. This finding is consistent with the economic and financial literature that emphasizes a positive relationship between GDP and government spending, which means a statistically positive impact of GDP on government spending and an increased GDP by 10%, which leads to an increase in government spending by 0.24%. This finding can be explained by the fact that the government expands spending in a way that corresponds to increasing the GDP in the short and long term in Jordan.

According to the T-test, the result is statistically significant at 1%. The confidence level for this variable is equal to 99%. Therefore, the hypothesis is accepted, that is, a statistically significant positive relationship exists at the level of $\alpha 0.05$ between the GDP and government spending.

ARDL analysis also showed that the relationship between GDP (-1) and the change in government spending (EX) is positive. According to the T-test, this result is statistically significant at the 1%, and the confidence level for this variable is equal to 99%.

The second hypothesis: A statistically significant positive relationship exists at the level of $\alpha = 0.05$ between government revenue and government spending.

The GDP is increased by 10%, which leads to the increase in government spending by 0.16.5 %. This finding can be explained by the fact that the government expands spending in a way that corresponds to increasing government revenue.

The state relies in local revenue to increase government spending, and taxes are the main source of local revenue in Jordan. This measure has a negative impact on the national economy because the increase in domestic revenues through increasing taxes has a negative impact on local revenues in the future. In the long term, it leads to a reduction in investment in projects and companies and consequently reduces revenues.

Ibn Khaldun was referring to this phenomenon when he said that an increase in tax revenues leads to an increase in revenues in the beginning; however, the increase in more expenses for the state on luxury leads the country to increase taxes to cover the increase in its expenses. If the state continues with this measure, economic growth will be affected, and the tax revenue will decrease later, which is expressed by the laver curve (Muhammad Adainat, 2020).

The third hypothesis: There is a statistically significant positive relationship at the level of ($\alpha 0.05$) between economic openness and government spending.

This hypothesis can be explained by the fact that OP leads to increased government purchases of services and goods that commensurate the openness to the outside world. Moreover, OP increases the demand for transport services and social services and creates more institutions that increase government spending.

The fourth hypothesis: There is a statistically significant positive relationship at the level of ($\alpha 0.05$) inflation rate and government spending

The standard analysis in table (5) shows that the estimated coefficient to INF (-1) is equal to 49, which means that the relationship between the change in INF (-1) and the change in government spending is positive. This finding is consistent with that of some previous studies (e.g., Adamu Jibir and Chandana Aluthge, 2019) that emphasize a positive relationship between INF (-1) and government spending, which means a statistically positive impact of INF (-1) on government spending. It also means that INF (-1) is increased by 10%, which leads to an increase in government spending by 49%. This increase can be explained by the nature of the non-productive Jordanian economy. High inflation leads to an increase in the costs of goods and services purchased by the public sector and an increase in wages and salaries for workers in the government public sector. The state follows the system of linking wages to inflation and consequently leads to an increase in current government spending.

The fifth hypothesis: There is a statistically significant positive relationship at the level of ($\alpha 0.05$) Unemployment rate and government spending.

The standard analysis in table (5) shows that the estimated coefficient to unemployment rate is equal to -153.5, which means that the relationship between the change in unemployment rate and the change in government spending is negative. This finding is consistent with those of some previous studies (Adamu Jibir & Chandana Aluthge, 2019). Moreover, this result is consistent with the analysis of the simple correlation between the

unemployment rate and the rate of government spending growth in table 2. A negative relationship is found between unemployment rate and government spending, which means that unemployment rate has a negative impact on government spending. It also means that the stable unemployment rate of 10% leads to an increase in government spending by 153.5%. This result can be explained by the fact that a decrease in unemployment leads to an increase in government spending, which is the nature of the Jordanian economy that depends on employment in the government sector. Therefore, a decrease in the unemployment rate means an increase in employment in the public sector and consequently an increase in government spending.

ARDL analysis also shows that the relationship between UNM (-1) and the change in government spending (EX) is negative. According to the T-test, this result is statistically significant at the 1% confidence level because this variable is equal to 99%.

The sixth hypothesis: There is a statistically significant positive relationship at the level of (α 0.05) Population growth rate and government spending.

The standard analysis in table 5 shows that the estimated coefficient to population growth is equal to (-9174.9) which means that the relationship between the change in population growth and the change in government spending is negative. This result is not consistent with the literature and economic theories but is consistent with some studies, such as the study of Sultan N. Abu Tayeh, R. Mairna, and H. Mustafa (2011), which was about the determinants of government spending in Jordan. This result is consistent with the analysis of the simple correlation between population growth and the rate of government spending growth in Table 2. A negative relationship exists between population growth and government spending.

Therefore, the stable population growth by 10% leads to the increase government spending by 9174.9%. This surprising result can be explained by the higher increases in population growth than in spending growth and the economic problems, budget deficits, and limited resources in the Jordanian economy.

ARDL analysis in Table 5 shows that the relationship between GPOP (-1) and the change in government spending (EX) is negative. According to the T-test, this result is statistically significant at the 1% confidence level. The variable is equal to 99%.

The seventh hypothesis: There is a statistically significant positive relationship at the level of (α 0.05) Public debt and government spending.

The analysis shows a positive but not statistically significant relationship between public debt and government spending. The explanation is that the government uses debt to cover the shortfall in revenues to prevent increasing government spending in Jordan in the short and long term. Therefore, the hypothesis that a statistically significant positive relationship exists at the level of α 0.05 between public debt and government spending is rejected.

The eighth hypothesis: There is a statistically significant positive relationship at the level of (α 0.05) between government spending (t-1) and government spending in year (t).

The standard analysis in table 5 shows that the estimated coefficient to EX (-1) is equal to (-49%), which means that the relationship between the change in government spending (t-1) and the change in government spending is negative. This finding means that EX (-1) has a negative impact on government spending and that an increase in government spending (t-1) by 10% leads to a decrease in government spending by 0.49% because of economic problems, budget deficits, and limited resources in the Jordanian economy.

A long- and short-term analysis was conducted using an ARDL analysis.

Table 6 shows a long-term analysis. Its results correspond to the unrestricted ARDL analysis and show a positive relationship between government spending as a dependent variable and GDP, government revenues, OP, and the inflation rate as independent variables in the long run. It also shows a negative relationship between government spending as a dependent variable and the unemployment rate, population growth rate, and government spending in the last year. The relationship between government spending and public debt was positive but not statistically significant.

Figure 3 indicates that the predictive capacity of the government spending model at a long-term level is acceptable in Jordan.

Table 6. long-term ARDL analysis

Variable	Coefficient	t-Statistic	Prob.
C	2193.908	8.247798	0.0004
EX(-1)*	-1.398615	-31.47268	0.0000
GDP(-1)	0.397168	26.65721	0.0000
TR**	0.165001	3.975969	0.0106
OP**	1478.166	11.54134	0.0001
GPOP(-1)	-17778.77	-13.68560	0.0000
INF(-1)	38.24787	3.110492	0.0265
UNM(-1)	-209.7666	-10.65971	0.0001
TB**	0.013614	1.680131	0.1538
D(GDP)	0.244998	4.617693	0.0057
D(GPOP)	-9174.867	-11.25485	0.0001
D(INF)	-10.68749	-1.094169	0.3238
D(UNM)	-153.5367	-10.72869	0.0001

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.283972	0.007045	40.30850	0.0000
TR	0.117974	0.029490	4.000545	0.0103
OP	1056.878	94.32085	11.20514	0.0001
GPOP	-12711.70	890.9691	-14.26727	0.0000
INF	27.34696	8.937743	3.059717	0.0281
UNM	-149.9817	13.28087	-11.29306	0.0001
TB	0.009734	0.005829	1.669935	0.1558
C	1568.629	172.3220	9.102892	0.0003

$$EC = EX - (0.2840 * GDP + 0.1180 * TR + 1056.8782 * OP - 12711.6988 * GPOP + 27.3470 * INF - 149.9817 * UNM + 0.0097 * TB + 1568.6288)$$

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

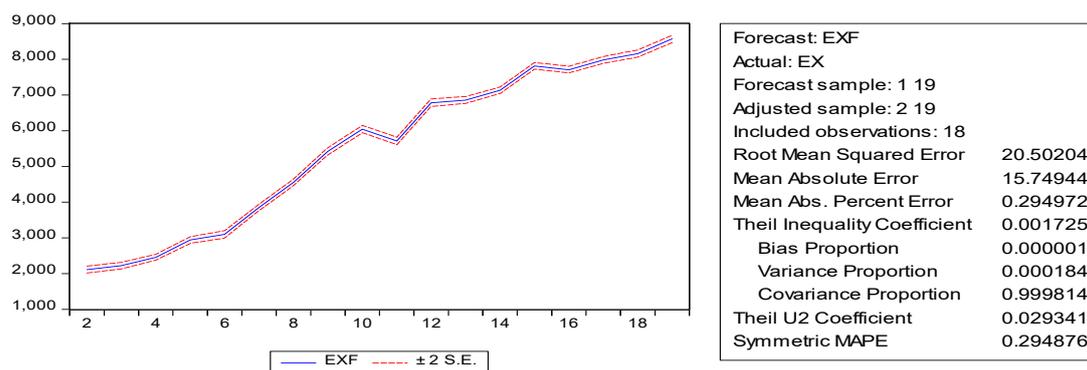


Figure 3. Test the predictability of the model

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

The short-term analysis in table 7 also showed a statistically significant positive relationship between government spending and GDP on a short-term level. The analysis also showed a statistically significant negative relationship between government spending and population growth rate, inflation rate, and unemployment rate as independent variables at the short-term level.

Figure 4 indicates that the predictive capacity of the government spending model at a short -term level is acceptable in Jordan.

Table 7. The short-term ARDL analysis

Variable	Coefficient	t-Statistic	Prob.
C	2193.908	56.59440	0.0000
D(GDP)	0.244998	29.82091	0.0000
D(UNM)	-153.5367	-27.07969	0.0000
D(INF)	-10.68749	-8.573378	0.0004
D(GPOP)	-9174.867	-25.58078	0.0000
CointEq(-1)*	-1.398615	-57.83540	0.0000

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

R- Squared: 99%;

Adjusted R- Squared: 99%;

F-Statistic: 950; Prob(F-statistic): 0.00;

Durbin-Watson stat : 2.67;

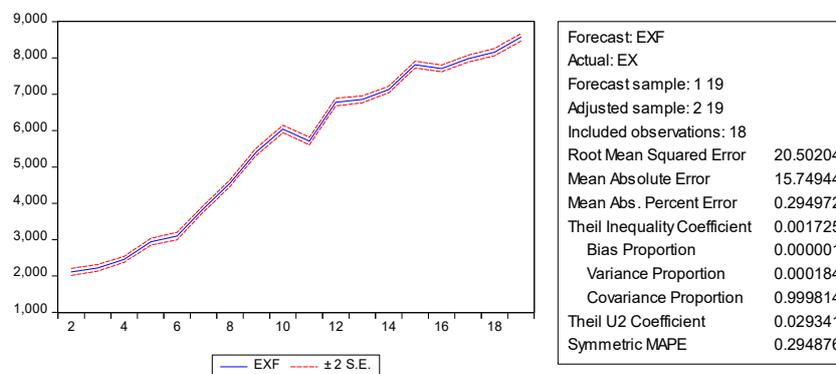


Figure 4. Test the predictability of the model

Source prepared by the researcher using the program E-views based on study data in Appendix (1).

7. Conclusion and Policy Implications

The GDP has an important positive effect on government spending, which means that the increase in the GDP leads to an increase in government spending and that government revenues have an important positive effect on government spending, which means that the state is working to increase government spending by increasing taxes. Also, economic openness (OP) has an important positive effect on government spending in the short and long term, which means that (OP) leads to an increase in services and goods that the state needs to fit in with (OP) and thus results in an increase in government spending.

Inflation rate has a positive effect on spending government, which is because of the increase in costs of goods and services provided to the state. Moreover, Jordan links workers' salaries to inflation. An increase in inflation leads to an increase in the cost of living within the current expenditures in the Jordanian public budget and in government spending in addition to that the Inflation rate has a positive effect on government spending, which means that (OP) leads to an increase in services and goods that the state needs to fit in with OP and thus results in an increase in government spending.

Unemployment has a negative impact on government spending, which means a great dependence on government employment in Jordan. That is, a decrease in unemployment is a result of an increase in government employment, which results in an increase in the number of employees in the public sector and thus an increase in current government spending. Population growth has a negative impact on government spending, which means that the increasing growth of the population is greater than the growth of government spending. That is, population growth from one year to another is greatly increased, whereas the increase in spending growth decreases from

year to year as the population growth increases because of economic problems and the public budget deficit, While Public debt does not affect government spending because the state borrows to cover the revenue deficit to prevent increase in government spending.

A statistically significant positive relationship exists between government spending (t-1) and government spending because of economic problems and a decrease in local resources to finance the public budget. Statistically significant positive relationships exist between government spending and the GDP, government revenues, OP, and the inflation rate in the long run.

Statistically significant negative relationships exist between government spending as a dependent variable and unemployment rate, population growth rate, and government spending in the last year. The relationship between government spending and public debt was positive but not statistically significant in the long run.

A statistically significant positive relationship exists between government spending and the GDP on at a short-term level, whereas statistically significant negative relationships exist between government spending and population growth rate, inflation rate, and unemployment rate as independent variables at the short-term level.

8. Recommendations

Based on statistical analysis this study recommends giving attention to public expenditures adjusting them in proportion to economic variables. giving attention to local revenues, controlling the mechanism of their collection, and increasing them by creating profitable economic projects that increase government revenues. Controlling inflation through the government's production of local goods and services, which reduces public expenditures that rise with inflation, especially at the long-term level also, this study recommends the reduction of unemployment through the partnership between the public and private sectors to reduce government spending.

This study recommends making government spending compatible with the increasing rate of population growth by spending on education, health, public services, and benefits to meet the needs of the population. Generating revenues through economic projects instead of through taxes, which leads to lower tax revenues in the long run in addition government intervention brings in more revenue through income-generating economic activities rather than relying on traditional tools, such as taxes. Also, the use of unconventional tools, such as Islamic sukuk, to fund government capital projects instead of using the public budget. This study recommends conducting more normative studies on the issue of government spending to help the country eliminate of the deficit in the public budget.

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Appendix

Table A. Data of study variables during the period (201-2019)

Y	GDP	EX	TR	GPOP	unm	inf	op	TB
2001	5998.6	1970.1	1610.1	0.025116	13.7	0.7	0.723539	22651.6
2002	6363.7	2123.5	1718.6	0.024307	14.7	1.8	0.755237	20674
2003	6794	2221.8	1750.8	0.023539	15.3	1.8	0.758891	26092.7
2004	7228.8	2442.4	1675.6	0.025239	14.5	1.6	0.795026	24876.8
2005	8090.7	2931	2147.2	0.065571	12.5	2.6	1.001875	22651.6
2006	8925.4	3104.4	2562.9	0.027961	14.8	3.5	1.121864	20674
2007	10675.4	3860.4	3164.4	0.028677	14	6.3	1.041369	17610
2008	12131.4	4540.3	3628.1	0.029152	13.1	5.7	1.063843	14482.8
2009	15593.4	5431.9	4375.4	0.029716	12.7	13.9	1.057627	12590.8
2010	16912.2	6030.5	4187.9	0.030354	12.9	-0.7	0.809289	10955
2011	18762	5708	4261.1	0.031054	12.5	5	0.813723	9394.2
2012	20476.6	6796.6	4198.9	0.042185	12.9	4.4	0.89107	8948.4
2013	21965.5	6878.2	4726.9	0.058435	12.2	4.7	0.886996	8147.4
2014	23851.6	7076.9	5119.8	0.084668	12.6	5.6	0.858331	7523.8
2015	25437.1	7851.1	6031.1	0.078373	11.9	2.9	0.84299	7430.8
2016	26637.4	7722.7	5910.6	0.078983	13	-0.88	0.72585	7206.8
2017	27444.8	7948.2	6233.6	0.024393	15.3	-0.78	0.660121	7006.5
2018	28448.5	8173.2	6717.4	0.025366	18.3	3.23	0.66991	6366.8
2019	29984.2	8567.3	6944.9	0.024833	18.6	4.46	0.636826	6278.5

Source: The Central Bank of Jordan. Retrieved from <https://www.cbj.gov.jo/Pages/viewpage.aspx?pageID=67>

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