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Abstract

This study investigates the causal relationship between the components of both public revenues and public expenditure in Jordan during the period (1976-2016), as a result of the stationary of all study variables at the first difference. The study uses the causality in the error correction model, which shows an existence of a bidirectional causality between direct tax revenues and capital expenditures, and bidirectional causality between non-tax revenues on one hand, and current and capital expenditure on the other hand, as well as, a unidirectional causality from current expenditures to both direct and indirect tax revenues, and unidirectional causality from capital expenditure to indirect tax revenue, and unidirectional causality from foreign aid to both current and capital expenditure. This study recommended that the government ascertain the nature of the existed causal relationship between public revenues and public expenditures, when it make any decision about changing revenues and public expenditures, to don't leave any negative impact on the government budget, and on the rest of the economic variables later on.
Keywords: Causalities, Public Revenues, Public Expenditures, Spend-Revenue Hypothesis.

Introduction

Governments seek to adopt fiscal policies in order to increase the efficiency of the of public services provision, and to rationalize subsidies, and to minimize tax evasion, to reduce the losses of revenues to abate the deficit of the government general budget. Shedding light on the financial

view of the Jordanian government signifies the rough situation, that the government staying because it doesn't have the ability to reduce both current and capital expenditures, which exceed public revenues, especially that is related to refugees dilemma requiring more and more outgoings. At the same time, the government cannot override more taxes and high prices that are fatigued for Jordanian citizen to increase these revenues. Jordanian economy can't compete others and cannot afford more declines in foreign aids which the government depends on to cover public expenditure.

In view of the permanent budget deficit of Jordanian economy; an efficient financial management system must be adopted to avoid adverse affect on the economic performance. This system must come through a full understanding of the essence of the relationships between public revenues and public expenditure and the ability to interpret these relationships. Because the deficit will eventually will bear by the government, and will have to borrow more, then it will raise taxes and prices if there are more budget deficit.

In light of the fiscal deficit of the Jordanian government budget, the urgent need for more expenditure, and the difficulty of increasing the local and foreign revenues by getting more local taxes and aids from donor countries. This study seeks to help the decision-makers of expenditure management and revenue collection in Jordan based on its results, in order to address the problem of budget deficits, otherwise it will have mysterious implications for the financial situation in particular, and the economic situation in general, so the decision-makers must be wary for the public revenues and public expenditure with having knowledge about causality between revenues and public expenditure, when they take any decision about change public revenues or public expenditure or both .

Research Problems

In light of the high deficit in the budget of the Jordanian government, and the urgent need for more current and capital expenditure, and the difficulty of increasing the public revenues, whether local ones; by expanding the tax base, or increase tax rates, or external by getting more foreign aid from donor countries, this study come to determine the nature of causal relations between the components of revenues and public expenditures in order to adopt an efficient financial management system that contributes to the exploitation of available financial resources to reduce the chronic budget deficit in the future.

Theoretical and Applied Framework

When the state suffers from a budget deficit, the interest in fiscal policy becomes necessary in order to make the right decisions that lead to reduce that deficit. And then positively effect on the rest of the economic variables, pushing them towards their balance paths, and Prior to make decisions of both the current and the capital aspects of public expenditure. The public revenues represented by direct tax revenues, indirect tax revenues, non-tax revenues, and foreign aids. The nature of the relationship between these variables must be known, to make right decisions that have a positive impact on the budget of that state. Therefore, these fiscal policies are thus successful, especially if the state depends on tax revenues. If the fiscal policies are not successful and the deficit is occurred, the government will cover the deficit through internal and external borrowing, which leads to increase taxes, to rise prices, raise interest rates, and then to shift from deficit problem to rising public debt, inflation and low investment.

The relationship between the public revenues and expenditure undergo many theoretical economic ideas, and applied studies that have gained different results, among different economies, the debate on the nature of the relationship between them, and their direction to different perspectives. The adoption of different fiscal policies within the economy, they focus on collecting revenue first, and then determine the size of expenditure based on these revenues, including focusing on the first quantification of expenditures, and then collecting the appropriate revenue for those expenditures, The decision is correct only after determining the direction of the causal relationship between public revenues and public expenditure, to translate it into a financial policies adopted by the decision makers, to build up reach an efficient financial system, among the hypotheses that link government expenditures to public revenues and have been adopted by many of economists, these hypothesis are:

First: the revenue-spend hypothesis, which states that the changes in government revenues change government expenditure, and government authorities adjust their expenditure to their level of revenues to reduce growth in the public sector in an unbalanced way, There is a unidirectional causality between revenues and expenditure, and any increase in revenues means increasing the financial resources and goes as increase as possible in government expenditure, in other words, if it accompanied by a budget deficit, deficit would be difficult to be reduce (Richter and Dimitrios, 2013).

Second: Spend - Revenue hypothesis, According to this hypothesis, the political system determines the size of the public expenditure first in some way, and then the adjustments are made to the fiscal policy in respect of the tax and the sources of revenue in order to finance those expenses, in this case Any temporary increase in government expenditures will result in a permanent increase in future revenues, which will also reduce the deficit if exist, because the amount of public expenditure has already been determined (Roberts, 1978) and (Peacock and Wiseman 1979). There is unidirectional causality from public expenditure to government revenue. So, according to this hypothesis a government authorities have to adjust revenues to the level of planned expenditures, It does not mean that the increase in public expenditures must be accompanied by an increase in government revenues in absolute terms, but to a certain extent, according to the Laffer curve, where tax revenues reach as high as possible at a given tax rate ((t^*), as in figure (1), after that tax revenues will decline (Begg et at, 2003).

Figure (1), Laffer curve.
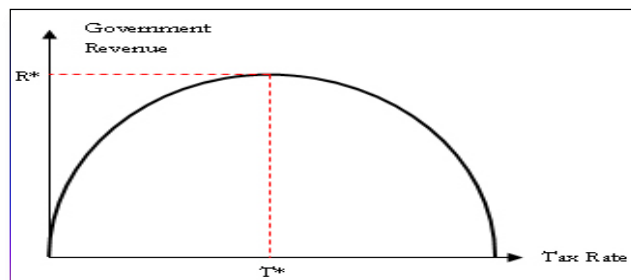
Third: The simultaneous financial hypothesis (fiscal synchronization hypothesis), which point out that revenues and public expenditures occur at the same time, that is, there is a bidirectional causality between revenue and public expenditure, and the decision to choose the optimal size

of revenue and expenditure depends on marginal benefit and marginal cost of government programs for public revenue and expenditure (musgrave, 1966) and (meltzer and richard, 1981). Fourth: the hypothesis of financial independence or which is called "institutional neutrality hypothesis". According to this hypothesis, the government revenue decision is independent of the government expenditure decision, that is, there is no causal relationship between revenues and public expenditures (baghestani and mcnown, 1994). So, in this case, fiscal policy is an unsustainable policy.

The practical aspect of the nature of the relationship between revenues and public expenditures remains controversial, because of the difference between diverse economies. The results of the studies are different among economies. Some of them support (revenue - spend hypothesis), others support (spend - revenue hypothesis), or support (fiscal synchronization hypothesis), a lot support (fiscal neutrality hypothesis). The diversity of the in results related to the different measurement methods, or the different time periods during which these studies were conducted, and the economic conditions that accompanied those periods, especially in developing countries, whose studies results may be counterbalanced the results of the theoretical application of fiscal policy, where their expenditures increase in times of economic recovery as they can borrow easily and increase their expenses, not the reason for increased revenues, but in periods of economic recession, government expenditure of these countries decreases due to the difficulty of borrowing, or borrowing at relatively high interest rates, therefore we find a difference in the nature of the causal relationship between the revenues and the public expenditure between the economies of different countries, or within the same economy during different periods of time (alesina and perotti, 1994). We mention here some studies, whether local or foreign.

Maghyereh and Sweidan, (2004), conduct a study entitled "government expenditures and revenues in Jordan, what cause what? Multivariate co-integration Analysis", The study used the annual data for both expenditure and government revenues during the period (1969-2002), to test the expenditure-revenue, and revenues- expenditure, and fiscal Synchronization hypotheses for Jordanian case. The results from Granger causality test and impulse response function and variance decomposition analysis based on the corresponding multivariate error correction confirms the realization of the fiscal Synchronization hypothesis in the Jordanian economy.

Al-Mashreqi (2007), conduct a study "the Causal Relationship between Government Expenditures and Revenues in Jordan 1976 – 2005". The data of both government expenditure, and government revenue and GDP were used during the period (1975-2005). The Johansen co-integration and Granger causality in vector error correction test are used; the results showed a long-term balance between government expenditures, government revenues, and GDP, There is also existence of unidirectional effect from government expenditures to revenues, as well as unidirectional effect from government revenues and government expenditures to GDP. Based on these results, the study recommended that government expenditure must be set first and work

to reduce the government expenditures in future, Thereby reducing the need for more government revenues to increase GDP and treating budget deficit in long-run.

Taha and Loganathan (2008), entitled: "Causality between Tax Revenue and government spending in Malaysia, during the period (1970-2006)".This study is based on the lack of consistency in the trend of tax revenues and its dependence on economic and political conditions in the country. The Malaysian government relies heavily on tax revenues to finance spending, especially in abnormal situations such as wars, financial crises or rise in global oil prices. The model analyzed by using the methodology of (VAR), which shows that there is a long-term equilibrium relationship between tax revenues and government spending, with bidirectional causality between direct and indirect tax revenues and government spending, and the absence a relationship between non-tax revenues and government spending.

Al-Khulaifi, (2012), entitled: "The Relationship between Government Revenue and Expenditure in Qatar: A Cointegration and Causality Investigation" This study aimed to investigate the nature of the causal relationship between government revenues and expenditures in Qatar during the period 1980-2011, The results of the study, which come out through using Engle-Granger's co-integration and Granger causality, show that the variables under study are integrated and that there is a unidirectional relationship between government revenue and government expenditure, Thus, the revenue-expenditure hypothesis is achieved in the country situation during that period.

 Aregbeyen and Insah (2013), entitled by "A Dynamic Analysis of the Link between Public Expenditure and Public Revenue in Nigeria and Ghana". Which aims to investigate the nature relationship between expenditure and government revenues for Nigeria and Ghana during 1980-2010, the study adopted the DOLS method in the analysis, which is better in the case of small samples to avoid bias in the results, and found a bidirectional relationship between the revenues and public expenditures of Nigeria and Ghana. The study also found a causal relationship between the periods of lagging, and leading of government revenues and expenditures in those countries, where there was a negative relationship between government revenue and expenditure of the Nigerian situation and a positive relationship to the Guinean situation. Finally, the study concluded that expenditures in previous years positively affect on current revenues in the Nigerian economy.

Atiar Rahman and Abdul wadud, (2014), entitled by "tax and spend, spend and tax, Fiscal Synchronization, or fiscal neutrality: evidence from Bangladesh", The study aimed at testing the hypotheses in the title; by analyzing the trend of the causal relationship between expenditure and government revenues in Bangladesh during the period 1973-2013, and through the Johansen's and VECM methodology, There is a long-term balance between revenues and public expenditure, with unidirectional causal relationship between taxation and expenditure, and

therefore the hypothesis-revenue - Spend is applicable to the economic situation in Bangladesh during the study period.

Mupimpila et al., (2015), entitled "the causality between government revenues and expenditures in Botswana", This study aimed to find proposals to reduce government expenditure after knowing the nature of the causal relationship between government revenues and expenditures. The study found a negative unidirectional relationship between government revenue and expenditures by using (VECM) and Granger's causality. Based on that conclusion, the study recommended that the government's budget deficit could be reduced by increasing tax revenues; by expanding the tax base, improving the tax administration to reduce Tax evasion.
Al-Zeaud, (2015), entitled "The Causal Relationship between Government Revenue and Expenditure in Jordan". This study was conducted on the data of expenditure and government revenues in Jordan during the period 1990-2011, by using the causality in the error correction model, the result shows bidirectional causality between expenditure and government revenue, This means that the allocation of current expenditures determines the amount of government revenue, which in turn affects the expenditure of the current and lead fiscal year, so this should be taken into consideration by the decision-maker regarding the fiscal policy.

According to previous studies, we note that most of the studies used the same methodology of analysis, and came out with different results about the nature of the relationship between government expenditures and revenues depending on the nature of the economy of each region and on the period of data collection that used in the analysis. The most important result of these studies are that about the Jordanian economy, which of them shows bidirectional relationship between government revenue and expenditure (Maghyereh and Sweidan, 2004) and Al-zeaud (2015), and another study shows unidirectional relationship between government revenue and expenditure (Al-Mashreqi, 2007). In addition, all the previous studies conducted on the Jordanian case used both government revenue and expenditure as a general sum, none of them dealt with the analysis of the components of both government revenues and expenditures or foreign aid to determine the nature of the causal relationship between these components, and this is what the new adding of this study to the previous studies conducted on the Jordanian case, In addition to select a relatively long period of time that contains all the periods of time that have been carried out previous studies of the Jordanian case.

Methodology
This study bases on the annual data published by the Central Bank of Jordan and the General Budget Department for both revenues and public expenditures in order to test the causal relationship between them, In terms of public revenue, they are divided into domestic revenues, which are: direct tax revenue $(DTax)$, that includes taxes on income and profits, taxes on financial transactions, airline ticket tax, departure tax. Indirect tax revenues $(IDTax)$, which includes the general tax on goods and services, customs duties, and fees, Non-tax revenues

$(NTax)$, which includes retirement income, property income, revenues from selling goods and services, And finally foreign revenues (Gra), which are represented by foreign aid.

The Public expenditure is divided into current expenditures $(Cu\exp)$, which include military expenditures, compensation of employees, interest payments, and subsidy. Capital expenditures $(Ca\exp)$, which include expenditure on buildings and construction, support of government units, use of goods and services, equipment, furnishing, supplies, land, studies and research, noting that all variables are measured in million Jordan Dinars.

The reliability of the results of econometrics models depends on the statistical characteristics of the time series of the variables under study, the most important characteristic to be provided in the time series are stationary, which means the stability of the arithmetic mean, and variance of the values of the time series over time (Nelson and Plosser, 1982), so the study used the Augmented Dickey - Fuller test to determine the degree of stationary for each time series separately, it was found that all the variables under study are stationary on the first difference $I(1)$, as the results clarifies in Table (1).

Table (1): Unit Root Tests.

variable	Calculated value	Critical value	Lag Length	degree of stationary	Level of significance
$DTax_t$	-4.22	-2.63	0	first difference *	1%
$IDTax_t$	-2.81	-2.63	0	first difference *	1%
$NTax_t$	-4.01	-2.63	2	first difference *	1%
Gra_t	-10.96	-2.63	1	first difference *	1%
$Cu\exp_t$	-12.63	-2.63	0	first difference *	1%
$Ca\exp_t$	-2.02	-1.95	1	first difference *	5%

* denote without intercept and trend.

After testing the stationary of the study variables, the Johansen's cointegration test was examined to determine the extent of a long-run equilibrium relationship between them, which changes together over time, The results in table (2) indicates that there are four vectors for the joint integration of the variables under study at a significant level of 5%, according to Trace Test and Max Eigen Value Test, thus ensuring a unidirectional or bidirectional causal relationship between the integrated variables.

Table (2), Johansen's Cointegration Tests.

Null hypothesis	λ max		λ trace	
	critical value*	Maximum Eigenvalue	critical value*	Statistics
$r = 0$	36.63	89.24	83.93	195.48
$r \leq 1$	30.43	45.60	60.06	106.24
$r \leq 2$	24.16	34.07	40.17	60.63
$r \leq 3$	17.79	19.79	24.27	26.56
$r \leq 4$	11.22	6.61	12.32	6.77

* denote statistical significant at the 5% level.

   Because of the integrated of the first-order variables $I(1)$, the traditional Granger method cannot be used to test causality, Therefore, we conducts Granger causality by means of a vector error correction model (VECM), which is derived from the VAR model, Because the sensitivity of this test to the lag length, the appropriate time gap was chosen by selecting the lowest Akaike Information Criterion (AIC), Schwarz-Bayesian (SBC), and the Hannan-Quinn (HQC) statistics, the result in table (3) shows that the lowest value of this criterion is at the lag length equal three, which used in estimating the VECM (Granger, 1988) and (Engle and Granger ,1987).

Table (3), Selection of lag length.

Lag order	HQ	SC	AIC	FPE	LR	Logl
0	79.97	80.13	79.87	1.97e+27	NA	-1511.62
1	73.47	74.64	72.83	1.76e+24	277.12	-1341.779
2	70.21	72.38	69.01	4.5e+22	142.74	-1233.28
3	68.51 *	71.68 *	66.77 *	7.22e+21 *	78.72 *	-1154.57 *

 *- statistical significant optimal lag length at 5% level.

Empirical Results

     From Table (4), which illustrates the results of the causal test, using the Granger causality of a vector error correction model, we can see that there are unidirectional and bidirectional causalities between the components of public revenues and public expenditure, summarized as follow:

1- There is a bidirectional causality relationship between direct tax revenue and capital expenditure, this is because a country that is able to collect direct tax revenues effectively has a tendency to increase capital expenditure, and vice versa, in the case of higher capital expenditure, the economy will grow and incomes rise, leading to an increase in direct tax revenues. Therefore, the decision maker must know this well when they make any decision related to capital expenditures and direct tax revenues. Any decision to increase direct taxes must be accompanied by a decision to increase capital expenditures to avoid adversely affect the economy.

2- There is a bidirectional causality relationship between non-tax revenues on one hand, and current expenditures and capital expenditures on the other hand; this is because when the government be able to effectively collect non-tax revenues, it has a tendency to increase current and capital expenditures. Contrarily, when current expenditures rise, incomes rise, then the demand for goods and services increases, this will lead to high increase in non-tax revenues, as well as capital expenditure increased, especially the private investment that has a positive complementary relationship with public investment (Ghazo, 2016)

3- There is a unidirectional causality relationship starts from current expenditures to both direct and indirect tax revenues, which means that any policy the Government takes to increase the current expenditures will positively affect the volume of direct and indirect tax revenues, for example; If the government decides to raise the level of salaries for public sector workers, or increase the number of employees, it will increase tax revenues, such as: income taxes, and indirect tax revenues as a result of increase in demand for goods and services, which lead to an increase in sales tax collection, which accounts for the bulk of indirect tax revenues

4- There is a unidirectional causality relationship starts from capital expenditure to indirect tax revenues, this means that any increase in government capital expenditure will lead to increase the private investment, thereby increasing employment and production, then increasing demand for import inputs of productive, leading to increase government revenues of customs duties, as well as it lead to increase domestic demand for goods and services, i.e., increased revenues from sales tax on goods and services, related to the complementary relationship between public and private investment. Therefore any current reduction in capital expenditure will increase the deficit of the budget later.

5- The existence of a unidirectional causality relationship from foreign revenues to both capital and current expenditures; means that Jordanian economy depends on foreign aid in covering public current and capital expenditures.

Table (4), VECM Granger Causality.

Pair wise hypothesis	Obs.	Chi-square	P-value	Decision	Type for causality
$D(DTax) \Rightarrow D(Ca\exp)$	37	8.64	0.035	Reject H_0	BDC
$D(DTax) \Rightarrow D(Cu\exp)$	37	2.04	0.564	DNR H_0	NC
$D(IDTax) \Rightarrow D(Ca\exp)$	37	5.86	0.118	DNR H_0	NC
$D(IDTax) \Rightarrow D(Cu\exp)$	37	21.54	0.0001	Reject H_0	UC
$D(NTax) \Rightarrow D(Ca\exp)$	37	31.86	0.000	Reject H_0	BDC
$D(NTax) \Rightarrow D(Cu\exp)$	37	18.07	0.0004	Reject H_0	BDC
$D(Gra) \Rightarrow D(Ca\exp)$	37	13..22	0.004	Reject H_0	UC
$D(Gra) \Rightarrow D(Cu\exp)$	37	9.34	0.025	Reject H_0	UC
$D(Ca\exp) \Rightarrow D(DTax)$	37	13.77	0.003	Reject H_0	BDC
$D(Cu\exp) \Rightarrow D(DTax)$	37	11.82	0.008	Reject H_0	UC
$D(Ca\exp) \Rightarrow D(IDTax)$	37	22.28	0.0001	Reject H_0	BDC
$D(Cu\exp) \Rightarrow D(IDTax)$	37	0.71	0.87	DNR H_0	NC
$D(Ca\exp) \Rightarrow D(NDTax)$	37	8.91	0.030	Reject H_0	BDC
$D(Ca\exp) \Rightarrow D(NDTax)$	37	20.51	0.0001	Reject H_0	BDC
$D(Ca\exp) \Rightarrow D(Gra)$	37	0.66	0.88	DNR H_0	NC
$D(Cu\exp) \Rightarrow D(Gra)$	37	2.73	0.43	DNR H_0	NC

DNRHo. : do not reject null hypothesis.   *NC.*: no causality
BDC. :bidirectional causality.   *UC.* : unidirectional causality.

Conclusions

Based on the results of the study, we can conclude the following:
1- There is bidirectional causality relationship between tax revenue and public expenditure, Therefore, in light of budget deficit, emphasis should be placed on increasing capital expenditure first to ensure the increase of tax revenues on the one hand, on the other hand stimulate investment to achieving economic growth .
2- The Jordanian economy should rely the financing expenditures, especially capital expenditure, from foreign aid, to domestic revenues and not to leave them hostage to foreign aid, and the reason the importance of capital expenditure to economy.

Recommendations

Based on the findings of the study, we recommend the following:

1. When the government makes a decision concerning any components of public expenditure or revenue, it must be based on a scientific outcome depending on the nature of the causal relationship between them. Otherwise, the decision will be arbitrary and may be leave negative impact on the budget, and the rest of the economic variables.

2. Don't leave capital expenditures hostage to foreign aid, and gave it more attention, especially in the instability of foreign aid, and the existence of an complementary relationship with private investment, to contribute the attracting of foreign direct investment, Therefore, one aspect of current expenditure must be sacrificed in order to obtain higher returns in future and sustain economic development.

3. Making the public sector more efficient by reducing its size, which leads to a reduction in current expenditures, thus ensuring that there is no need to increase direct and indirect tax revenues currently, and to burden the consumer and producer on one hand, on the other hand, we ensure that capital expenditures increase private investment and increase revenues in the future, by achieving economic growth and controlling the budget deficit.

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