

Fiscal Policy Tools and Economic Growth in Jordan: Evidence from Time-Series Models

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Abstract

This paper examines equilibrium relationships and dynamic causality analyses between economic growth and fiscal policy tools in Jordan for the (1978-2017) period. It employs autoregressive distributed lag and vector error correction models. The results suggest that there is evidence of a co-integration and causal relationships between economic growth and fiscal policy instruments. General government expenditures have long-run positive impact on economic growth, implying that general government expenditures improve economic growth. Moreover, total tax rates have long-run negative impact on economic growth, implying that a tax cut stimulates economic growth. These results are broadly consistent with similar studies carried out for other developing economies.

Keywords: econometrics, economic growth, fiscal policy, Jordan

1. Introduction

Fiscal policy and monetary policy are used to achieve macroeconomic objectives in a nation. These objectives include reduction in a nation's debt, sustainable economic growth, reduction of poverty levels, full employment, and inflation rate stability. The Jordan's potential for achieving macroeconomic objectives is yet to be realized. Consumer price index (2010 = 100) as a measurement of inflation rate has increased from 68.43 in 2001 to 119.34 in 2017 (World Bank Database, 2018). Unemployment is a major economic and political concern in most countries. On the average, the unemployment rate was 15% between the years 2001 and 2017 (World Bank Database, 2018). Jordan's Gross Domestic Product (GDP) growth between 2000 and 2009 averaged 6.5%, but from 2010 until 2016, average growth was a mere 2.5%. Moreover, Jordan's total public debt has increased at a rate exceeding economic growth. This has resulted in a debt-to-GDP ratio of 95% at the end of 2016, compared to approximately 61% in 2010 (Jordan Economic Growth Plan (JEGP) Report, 2018).

However, the combination of the global financial crisis of 2009, Arab spring regional turbulence, energy crisis, closure of trade routes resulting in de facto economic siege (Exports to Iraq amounted to 20% of Jordan's total exports), a decline in remittances, security costs, and increasing food and oil prices has put a significant stain on Jordan's economic and fiscal drive (Bekhet & Al-Smadi, 2017; Bekhet & Matar, 2013). A successful implementation of the International Monetary Fund (IMF) Extended Fund Facility (EFF) program and the JEGP will achieve macroeconomic objectives. According to the JEGP (2018-2022) report, Jordan and the IMF agreed to a USD 723 million EFF in order to lower debt levels and fiscal imbalance.

The issue of the relationships between economic growth and fiscal policy tools has been diversely investigated (e.g., Arai, Naito, & Ono, 2018; Ding, McQuoid, & Karayalcin, 2018; Lim & McNelis, 2018; Biolsi, 2017; Mencinger, Aristovnik, & Verbic, 2017; Attinasi & Klemm, 2016; Yang, 2016; Yushkov, 2015). In the case of a developing economy, Jordan, few researchers examined the relationships between fiscal policy tools and economic growth (e.g., Al-Fawaz, 2016; Abu Shihab, 2014; Al-Shatti, 2014; Hamdi, Alawin, & Abu Mhareb, 2009). However, the main objective of the current paper is to re-estimate the hypotheses of equilibrium relationships and dynamic causality analyses between economic growth and fiscal policy tools in Jordan. To the best of the author's knowledge and belief, the originality of this paper stems from three scopes. First, it employs Autoregressive Distributed Lag (ARDL) approach to examine equilibrium (i.e., long-run and short-run)

relationships between economic growth and fiscal policy tools. Second, it utilizes Vector Error Correction Model (VECM) to investigate dynamic causality between economic growth and fiscal policy instruments. Third, it uses long span of the Jordan's annual time-series data in constant 2010 bases for the (1978-2017) period.

The remainder of the paper is organized as follows. Section 2 presents a brief literature review related to economic growth and fiscal policy tools. Section 3 describes the data and theoretical model. Econometrics methodology and results analysis are given in Section 4, while the conclusions and policy recommendations are outlined in Section 5.

2. Review of Related Literature

Fiscal policy is based on the Keynesian economic theory which states that governments can influence economic growth by increasing or decreasing tax levels and public spending. This influence, in turn, maintains a healthy value of money, controls inflation, and increases employment. Numerous studies have examined different aspects of fiscal policy especially as it relates to economic growth. Papaioannou (2018) analyzed the influence of public expenditure on economic growth using Markov Switching regression and quarterly data for Greece. The results showed that the effects of government spending on economic growth are asymmetric over the business cycle. Madni and Chaudhary (2017) investigated the relationship among economic growth, institutional quality, and fiscal policy over the period (1984-2015), in the case of Pakistan. The ARDL approach was employed to determine the long-run and short-run relationship among the variables. Principal Component Analysis was carried out to construct an index for institutional quality. It was found that institutional quality and government spending were positively affecting economic growth, while educational attainment and private investment were significantly contributing to enhance economic growth. Osebo (2017) examined the impact of fiscal policy variables on economic growth for Ethiopia over the period (1974-2013). The fiscal policy variables are government expenditure, revenue, and budget balance. The results of VECM indicated that economic growth and fiscal policy variables had long run relationship. Moreover, the capital expenditure, direct tax and budget balance had positive relationship with economic growth in the long run.

Cyril (2016) investigated the effects of fiscal policy instruments on the Nigerian economy for the period (1985-2015). Descriptive statistics and ordinary least square methods had been employed after ensuring data stationary. The results showed that public expenditures on economic services (agriculture, construction, transport, and communication) had enormous returns to economic stability and growth. Jawadi, Mallick, and Sousa (2016) employed a panel Vector Autoregressive (VAR) model to assess the impact of fiscal policy and monetary policy shocks in economic activity for five key emerging economies—Brazil, Russia, India, China, and South Africa. The results showed that monetary contractions led to a fall in real economic activity and tighten liquidity market conditions, while government spending shocks had strong Keynesian effects. Ialomitianu, Danu, and Bucoi (2016) highlighted and explored efficient fiscal consolidation strategies that can ensure a stable economic growth through sustainable public finances. The conclusion they reached was that, in order to restore the sustainability of public finances, the need arises for considerable fiscal consolidation effort, as well as for deep structural reforms, with a view to creating favorable conditions for sustainable economic growth.

Shoayeb, Noman, and Khudri (2015) examined the impact of fiscal and monetary policies on economic growth in Bangladesh. The study concluded that exchange rate, interest rate, inflation rate, government revenue, and government expenditure significantly affected economic growth in Bangladesh. Bouakez, Chihi, and Normandin (2014) examined the effects of fiscal policy tools on the US economy before and after 1979. The results revealed that increases in public spending are in general more effective than tax cuts in stimulating economic activity. Ocran (2010) examined the effects of fiscal policy instruments (i.e., government expenditures, tax revenues, and budget deficit) on the South African economy. The structural VAR model was employed and quarterly data for the period (1990-2008). The results showed that tax revenues and budget deficit had positive effects on economic growth, while government investment and consumption expenditures had negative effects.

Hernandez de Cos and Castro (2008) estimated the effects of exogenous fiscal policy shocks in Spain in a VAR framework. Government expenditure expansionary shocks were found to have positive effects on output in the short-term at the cost of higher inflation and public deficits, and lower output in the medium and long term. Tax increases were found to drag economic activity in the medium term while entailing an only temporary improvement of the public budget balance. Auteri and Costantini (2004) examined the relationship between fiscal policy and economic growth in Italy for the period (1970-1995). The results revealed a positive influence of public investments on economic growth.

3. Data and Theoretical Model

For the purpose of this study, annual time-series data for the (1978-2017) period has been compiled from the

World Bank (2018) database, which covers the variables of economic growth and fiscal policy. The current paper uses the GDP (Billion JD) to measure economic growth. The variables of fiscal policy are General Government Expenditures (GGE, Billion JD) and Total Tax Rate (TXR, % of commercial profits). The general form of the model can be written as in Eq. (1):

$$GDP = f(GGE, TXR) \tag{1}$$

Eq. (1) is linear and can be converted into log-linear formulation as in Eq. (2) to avoid estimation problems, particularly variations, heteroscedasticity, and multicollinearity (Mugableh, 2018a; Mugableh & Oudat, 2018b; Mugableh & Oudat, 2018c; Mugableh, 2017a; Mugableh, 2017b; Bekhet and Mugableh, 2016; Mugableh, 2015a; Mugableh, 2015b; Mugableh, 2015c; Bekhet and Mugableh, 2013; Mugableh, 2013; Bekhet and Mugableh, 2012).

$$\text{LogGDP}_t = \alpha_0 + \alpha_1 \text{LogGGE}_t + \alpha_2 \text{LogTXR}_t + \varepsilon_t \tag{2}$$

Where, ε_t is the white noise term distributed with zero mean and constant variance. Based on the Keynesian economic theory, the signs of coefficients are expected to be as follows: $\alpha_1 > 0$ and $\alpha_2 < 0$. A positive relationship is hypothesized between economic growth and general government expenditures, while a negative relationship is hypothesized between economic growth and total tax rate. In a context of Keynesian economic theory, an expansionary fiscal policy aims to stimulate the economy can be done either by increasing government expenditure or by a tax cut or both. But, if this policy failed to achieve the desired growth rate then, the government will not get the desired tax revenue collection to finance government spending in the next period.

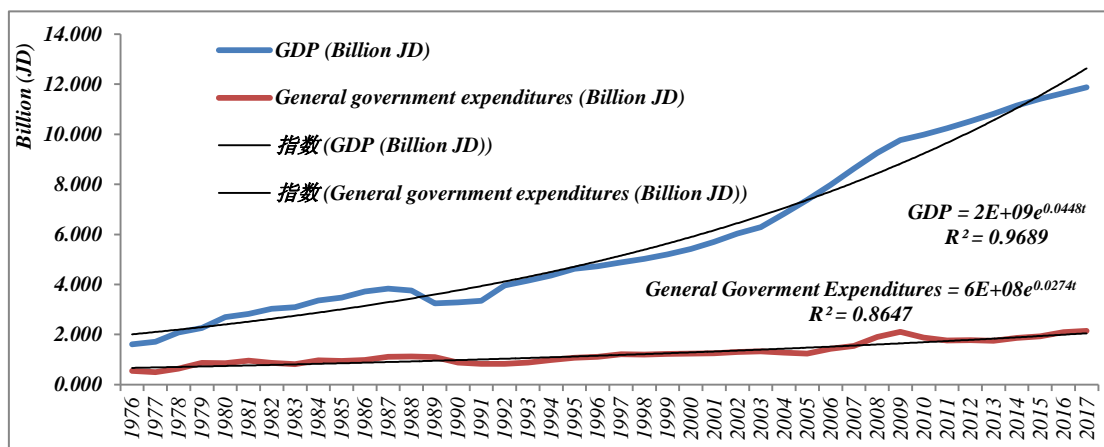


Figure 1. Growth rates of GDP and general government expenditures in Jordan for the (1976-2017) period

Growth rates of the GDP and general government expenditures are shown in Figure 1. It is very clear that growth rate of the GDP presents a highly symmetric behaviour for the (1976-2017) period, with average of 4.5%. Similarly, the growth rate of general government expenditures is constantly rising with average of 2.7%.

4. Econometrics Methodology and Results Analysis

The current paper employs the ARDL approach to examine long-run and short-run relationships between economic growth and fiscal policy instruments (i.e., general government expenditures and total tax rates). The ARDL approach is applied irrespective of whether the variables are co-integrated at $I(1)$, $I(0)$ or mutually and can be formulated as in Eq. (3):

$$\Delta \text{LogGDP}_t = \beta_0 + \beta_{1t} \text{LogGDP}_{t-1} + \beta_{2t} \text{LogGGE}_{t-1} + \beta_{3t} \text{LogTXR}_{t-1} + \sum_{s=1}^h \beta_{4s} \Delta \text{LogGDP}_{t-s} + \sum_{s=0}^h \beta_{5s} \Delta \text{LogGGE}_{t-s} + \sum_{s=0}^h \beta_{6s} \Delta \text{LogTXR}_{t-s} + \varepsilon_t \tag{3}$$

Where Δ is the first difference operator; β_0 is constant; $\beta_1 \beta_2 \beta_3$ are for long-run estimates, while other coefficients: $\beta_4 \beta_5 \beta_6$ are for short-run estimates. For ARDL approach, the first step is to test Eq. (3) by ordinary least square. The null hypothesis of no co-integration is $H_0: \beta_1 = \beta_2 = \beta_3 = 0$ against alternative $H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$. The F-statistics is used to test the existence of co-integration among variables. Critical values for F-statistics test are given by Narayan (2005). Pesaran, Shin, and Smith (2001) argued that if the calculated F-statistics value is higher than the upper bound i.e., $I(1)$, then, the H_0 of no co-integration is rejected and concludes the existence of co-integration. If

the calculated F-statistics value is below the lower bound i.e., $I(0)$, then, the H_0 of no co-integration is accepted and concludes that there is no long-run relationships among variables. If the calculated F-statistics value is between lower and upper bounds, then results are inconclusive. The VAR model is used to find maximum lag order that was 3 through Akaike information criterion and Schwarz Bayesian criterion as they are ideal for small sample size (i.e., 40 observations). Table 1 shows the results of Kwiatkowski, Phillips, Schmidt, and Shin (KPSS, 1992) unit root test. Economic growth, general government expenditures, and total tax rates are stationary at $I(1)$.

Table 1. Results of KPSS test

Integration	Variables	KPSS test statistic values	KPSS asymptotic critical values		
			1%	5%	10%
$I(1)$	LogGDP_t	0.20**			
	LogGGE_t	0.18*	0.24	0.19	0.13
	LogTXR_t	0.26***			

Note. (1) 10 bandwidths used by employing Bartlet Kernel to conduct KPSS test. (2) ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively. (3) Author's estimations using E-views software package version 9.0.

Table 2 shows the results of co-integration test. The calculated F-statistic value (5.71) is higher than the upper bound (5.54) at 1% significance level, showing a co-integration phenomenon between economic growth and fiscal policy tools. The result of co-integration is consistent with results obtained by Osebo (2017) for Ethiopia and by Madni and Chaudhary (2017) for Pakistan.

Table 2. Results of co-integration test

Function	Calculated F-statistic value	Tabulated F-statistics values					
		1%		5%		10%	
$\text{LogGDP}_t = f(\text{LogGGE}_t \& \text{LogTXR}_t)$	5.71***	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
		4.31	5.54	3.10	4.08	2.59	3.45

Note. (1) The tabulated F-statistics values were retrieved from Narayan (2005, Case II: restricted intercept and no trend, p. 1987). (2) *** denotes the significance at 1% level. (3) The computed F-statistic value was obtained from Micro-Fit software package version 5.5.

Once co-integration has been confirmed, next step is to estimate long-run and short-run relationships between economic growth and fiscal policy tools. In Table 3, the long-run and short-run results show that general government expenditures have a positive impact on economic growth, whereas total tax rates have a negative impact. These results are consistent with the Keynesian economic theory. That is, the stimulation of economy can be done either by increasing government expenditure or by a tax cut or both (i.e., expansionary fiscal policy).

Table 3. Long-run and short-run estimation results

Variable	Coefficient
Constant term	3.660 (0.499)
Long-run:	
LogGGE_{t-1}	5.400** (0.022)
LogTXR_{t-1}	-0.702*** (0.01)
Short-run:	
$\Delta\text{LogGGE}_{t-1}$	0.687 (0.811)
$\Delta\text{LogGGE}_{t-2}$	6.411** (0.015)
$\Delta\text{LogTXR}_{t-1}$	-1.156** (0.017)
$\Delta\text{LogTXR}_{t-2}$	-7.561(0.115)

Note. (1) the figures in parentheses are the p-values. (2) *** and ** represent 1% and 5% levels of significance, respectively. (3) Author's estimations using E-views software package version 9.0.

The VECM is employed in this study instead of VAR model because co-integration is confirmed among variables. The negative and significant error correction term (ECT) shows long-run causal relationships, while the F-statistics test illustrates the short-run causality. Eq. (3) can be transformed into an error correction model (ECM) yielding Eq. (4) as the following:

$$\begin{bmatrix} \Delta \text{LogGDP}_t \\ \Delta \text{LogGGE}_t \\ \Delta \text{LogTXR}_t \end{bmatrix} = \begin{bmatrix} \alpha_{1t} \\ \alpha_{2t} \\ \alpha_{3t} \end{bmatrix} + \sum_{s=0}^h \begin{bmatrix} \lambda_{11t} & \lambda_{12t} & \lambda_{13t} \\ \lambda_{21t} & \lambda_{22t} & \lambda_{23t} \\ \lambda_{31t} & \lambda_{32t} & \lambda_{33t} \end{bmatrix} \begin{bmatrix} \Delta \text{LogGDP} \\ \Delta \text{LogGGE} \\ \Delta \text{LogTXR} \end{bmatrix}_{t-s} + \begin{bmatrix} \beta_{1t} \\ \beta_{2t} \\ \beta_{3t} \end{bmatrix} [\text{ECT}]_{t-1} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \quad (4)$$

Where α_{it} ($i=1, \dots, 3$) denote the intercept terms; λ_{ijt} ($i, j=1, \dots, 3$) represent the coefficients to test the H_0 of no Granger causality in short-run; β_{it} ($i=1, \dots, 3$) denote the coefficients of (ECT_{t-1}) s. These coefficients test the H_0 of no Granger bidirectional causality in long-run. The results of VECM analysis are given in Table 4. There are bidirectional causal relationships between economic growth and fiscal policy tools in long-run and short-run.

Table 4. Results of VECM Granger causality analysis

Dependent variables	Sources of causation			
	Short-run			Long-run
	ΔLogGDP_t	ΔLogGGE_t	ΔLogTXR_t	ECT_{t-1}
ΔLogGDP_t	-	3.75** (0.022)	6.65*** (0.01)	-0.90*** (0.01)
ΔLogGGE_t	9.30*** (0.005)	-	7.40*** (0.007)	-0.80*** (0.01)
ΔLogTXR_t	5.20** (0.03)	3.40** (0.03)	-	-0.50** (0.02)

Note. (1) the figures in parentheses are the p-values. (2) *** and ** represent 1% and 5% levels of significance, respectively. (3) Author's estimations using E-views software package version 9.0.

5. Conclusions and Policy Recommendations

The main objective of this paper is to investigate equilibrium relationships and dynamic causality analyses between economic growth and fiscal policy tools in Jordan for the (1978-2017) period. It employs the ARDL approach and VECM. The results of the KPSS test show that economic growth, general government expenditures, and total tax rates are stationary at $I(1)$. The results of the bounds F-statistics test under the ARDL approach framework show the existence of a co-integration between variables. The outcomes of the ARDL approach show significant long-run and short-run relationships between economic growth and fiscal policy instruments. The findings of the VECM show bidirectional causal relationships between economic growth and fiscal policy tools.

Based on the results of this study, the following policy recommendations could be drawn:

- The policy makers in the government of Jordan should concentrate on implementing the international monetary fund extended fund facility programs, and the Jordan economic growth plan, 2018-2022. These programs and plan will achieve macroeconomic objectives.
- The policy makers in the government of Jordan should conduct an expansionary fiscal policy in order to stimulate economic growth in long-run and short-run.
- The general government expenditures should be currently directed to the top two contributing sectors to GDP (i.e., government services and finance).

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