The Impact of Fiscal Policy Tools on Unemployment Rates in Jordan: Autoregressive Distributed Lag Approach

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Abstract

Objectives: The main objective of this study is to investigate the impact of fiscal policy tools on unemployment rates in Jordan during the period 1986-2019.

Methods: The study estimated two models; the first consists of tax revenues and aggregate government expenditure as independent variables, and the second consists of tax revenues in addition to capital and current government expenditures as explanatory variables.

Results: The study variables are integrated at different levels and cointegrated in both models as indicated by Augmented Dickey-Fuller Unit Root Test and Bounds Cointegration test. Therefore, the study used the Autoregressive Distributed Lag approach for estimation. The results for the first model clarified that the increase in aggregate government expenditure causes unemployment rates to decline in the short and long run. On the other hand, the results for the second model showed that the increase in tax revenues increases unemployment rates in the short and long run. Moreover, current government spending has significant negative short and long-run effects on unemployment rates, while capital spending has only a significant negative short-run impact.

Conclusions: Based on these outcomes, the study has introduced some recommendations with regard to increasing the effectiveness of fiscal policy instruments in reducing unemployment rates in Jordan.

Keywords: Unemployment, Fiscal policy, Government expenditure, Tax revenues

أثر أدوات السياسة المالية على معدلات البطالة في الأردن: منهجية الانحدار الذاتي للإبطاءات الموزعة

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دكتوراه في اقتصاد الأعمال، محاضر غير متفرغ في الجامعات الأردنية،
وباحث اقتصادي مستقل في شركة خبراء التميز للتدريب وتطوير الأداء.

ملخّص

الأهداف: الهدف الرئيس من هذه الدراسة هو اختبار أثر أدوات السياسة المالية على معدلات البطالة في الأردن خلال الفترة 1986-2019.

المنهجية: قدرت الدراسة نموذجين: الأول يشتمل على إيرادات الضريبة وإجمالي النفقات الحكومية كمتغيرات مستقلة، والثاني يشتمل على إيرادات الضريبة بالإضافة إلى النفقات الحكومية الرأسمالية والجارية كمتغيرات تفسيرية .

النتائج: متغيرات الدراسة كانت متكاملة من درجات مختلفة ومتكاملة تكاملا مشتركا في النموذجين مثلما أشار اختبار جذر الوحدة المعزز لديكي وفولر واختبار الحدود للتكامل المشترك. لذلك استخدمت الدراسة منهجية الانحدار الذاتي للإبطاءات الموزعة للتقدير. أوضحت نتائج النموذج الأول أنّ الزيادة في إجمالي النفقات الحكومية تتسبب في انخفاض معدل البطالة في الأجلين القصير والطويل. من ناحية أخرى، أظهرت نتائج النموذج الثاني أنّ الزيادة في إيرادات الضريبة تزيد معدل البطالة في الأجلين القصير والطويل. بالإضافة إلى ذلك، كان للإنفاق الحكومي الجاري أثرٌ سالب قصير وطويل الأجل، ذو دلالة إحصائية على معدل البطالة، بينما كان للإنفاق الرأسمالي أثر سالب قصير الأجل ذو دلالة إحصائية فقط.

خلاصة الدراسة: بناء على هذه النتائج، قدمت الدراسة بعض التوصيات المتعلقة بزيادة فعالية أدوات السياسة المالية في تخفيض معدلات البطالة في الأردن.

الكلمات الدالة: البطالة، السياسة المالية، النفقات الحكومية، إيرادات الضريبة.

1. Introduction

Unemployment refers to a condition in which citizens are not able to obtain the basic needs of life due to not having jobs. It is one of the big economic and social problems that persistently haunt governments and economists, reduces living standards, and hampers economic growth in all countries (AlSebti, 2019).

The Jordanian economy witnessed a chronic unemployment problem in its labor market since the eighties of the 20th century due to the excess supply of labor resulting from the substantial outcome of the educational system and the continuous inflow of foreign labor (AL- Saraireh, 2014). According to the Jordanian Department of Statistics, the unemployment rate rose to 25% during the first quarter of 2021 with a growing labor force and contracting investment projects. The return of Jordanian expats from Kuwait, the migration of Iraqi citizens to Jordan after the Iraqi invasion of Kuwait, in addition to the migration of Syrian citizens to Jordan after the Arab Spring uprisings of 2011 have contributed to inflating the size of the population and increasing the burden on the Jordanian labor market for generating adequate jobs (AL-Saraireh, 2014; Alrawashdeh et al., 2019). In fact, Jordan experienced high economic growth rates ranging from 6.7 to 8.7% between 2004 and 2008 (Central Bank of Jordan, 2008), without a corresponding remarkable decline in unemployment rates (Department of Statistics, 2008). This was due to investing in capital-intensive industries such as mining and real estate, as well as due to the increased demand for low-wage unskilled foreign workers in most labor-intensive sectors such as construction (AL-Saraireh, 2014).

These facts necessitate the need to determine the effectiveness of fiscal policy instruments in reducing unemployment rates by examining the effects of tax revenues and the main government expenditure components on unemployment rates in Jordan.

2. Objectives, importance and the problem of the study

2.1 Objectives of the study

This study aims to examine the impact of disaggregated public expenditure and tax revenues on unemployment rates in Jordan during the period 1986-2019. It also aims to draw up some recommendations based on the study outcomes, wishing that policymakers would consider such recommendations for reducing unemployment rates in Jordan.

2.2 The importance of the study

This study helps in enriching the existing literature since the empirical studies on this topic for the Jordanian economy are few and inconclusive. In addition, it is, to the best of the author's knowledge, the first study that investigates the impact of tax revenues and disaggregated public expenditure on unemployment rates in Jordan.

2.3 The problem of the study

Jordan has a fragile economy and suffers from the scarcity of natural resources, low economic growth rates, and high unemployment rates. However, the size of the Jordanian government measured by its expenditures to GDP has been too high throughout the last three decades. This matter necessitates the need to determine the public spending component that can reduce unemployment rates to focus on and properly utilize as a fiscal policy instrument. Moreover, the measures of the Jordanian tax system reform do not contribute to removing distortions and achieving fiscal and social justice, since the design and implementation of a fair progressive taxation system are still weak. Therefore, this study decomposed public expenditure into current and capital expenditures to investigate their effects in addition to the impact of tax revenues on unemployment rates. It specifically aims to answer the following research questions:

1- What is the relationship between current government expenditure and unemployment rates in Jordan?
2- What is the relationship between capital government expenditure and unemployment rates in Jordan?
3- What is the relationship between tax revenues and unemployment rates in Jordan?

3. Theoretical framework and literature review

The historical debate among economists regarding the role of fiscal policy in gearing the real economy is unsettled until now. For example, Wagner's law has stated that government spending is an endogenous factor and not a cause of stimulating economic growth and changing real economic variables. The neoclassical economic growth model has only focused on external factors, e.g., technological progress, that can affect economic growth since fiscal policy could not bring about changes in the real economy due to the law of diminishing returns adopted by this model. In the same context, the classical economic theory has ensured the ineffectiveness of fiscal policy in stabilizing the economy as a result of the crowding-out effect and distortionary effects of taxation. On the other hand, Keynesian macroeconomic theory has stated that fiscal policy is a source of economic stability, as aggregate demand increases when government spending increases or/and taxes decrease, resulting in real economic growth. In other words, expansionary fiscal policy causes an economic boom and hence reduces the unemployment rate in the short run. Similarly, endogenous economic growth models such as (Romer, 1986; Barro, 1990; Barro and Sala-i-Martin, 1992), have emphasized the serious role of productive government expenditure in affecting economic growth and reducing the unemployment rate in the long run, adopting the concept of constant and increasing returns, and believing that economic growth can be internally generated through endogenous factors.

In developing countries, public spending policy not only accelerates economic growth and creates jobs but also reduces poverty and improves living standards (AL- Saraireh, 2014). The empirical studies on the impact of fiscal policy instruments on unemployment rates have revealed that this subject is still open for further research as the existing findings are inconclusive and vary from one country to another. For example, AL- Saraireh (2014) examined the relationship between the unemployment rate and aggregate government expenditure in Jordan during the period from 2000 to 2011. The study utilized linear multiple regression analysis and found a significant positive correlation between unemployment and such expenditure, in addition to a significant positive relationship between these variables. Lately, Saraireh (2020) tested the effects of aggregate government spending, private investment, official development assistance, gross fixed capital formation, and employment opportunities on the unemployment rates in Jordan from 1990 to 2019, using Autoregressive Distributed Lag (ARDL) approach. He found that government expenditure has a significant positive effect on unemployment in the short run, while he found a significant negative long-run relationship between the two variables, as an increase in government expenditure by 1% reduces the unemployment rate by about 0.41%. Colombier (2009) employed the modified M-estimator to ascertain a stable positive growth effect of public infrastructure and education, showing that government size was not detrimental to growth for OECD (Organisation for Economic Co-operation and Development) countries. He did not find growth effects for taxes, concluding that endogenous economic growth theory is not corroborated in this regard, whereas fiscal policy directed at improving infrastructure and education could promote economic growth. Obayori (2016) investigated the impact of both recurrent and capital government expenditures on unemployment rates in Nigeria over the period of 1980-2013, using the cointegration and error correction term method. All variables were stationary and cointegrated at various levels. The results revealed that both government expenditure components have significant negative long-run relationships with the unemployment rates. Therefore, he recommended that expansionary fiscal policy should be promoted as it plays a significant role in economic development. In addition, he recommended increasing capital public spending,

especially in infrastructure development such as power supply improvement, so that citizens can utilize it to boost production and hence increase jobs. Monacelli et al. (2010) investigated the impact of fiscal policy on the USA labor market. They found that an increase in government spending (% of GDP) by 1% generates 1.2% as an output multiplier and 0.6% as an unemployment one. In addition, a 1% increase in GDP increases employment by about 1.3 million jobs.

Omran and Bilan (2020) used annual data over the period 1976-2018 and the SVAR model with an impulse response function in order to investigate the impact of fiscal policy on the unemployment rates in Egypt. They found that government spending has a negative impact on unemployment rates, while tax revenues have a positive long-run impact. The study recommended the Egyptian government apply an expansionary fiscal policy to decrease unemployment rates in Egypt. A year later, Abouelfarag and Qutb (2021) explored the short and long-run relationships between discretionary and nondiscretionary items of government expenditure and unemployment rates in Egypt during the period 1980-2017 using Vector Error Correction Model. They employed the Johansen cointegration test and found a long-run equilibrium relationship among the study variables. Their results revealed a positive long-run impact for both expenditure components on unemployment. The worsening effect of discretionary expenditures was attributed to employees' compensation and government subsidies. They also found that investment expenditure has insignificant effects on unemployment rates, which was attributed to the minor share of investment in government spending, in addition to investing in capital-intensive industries.

Furthermore, Mugableh (2019) investigated the relationship between economic growth and fiscal policy tools in Jordan over the period 1978-2017, employing ARDL and vector error correction models. He found cointegration and a causal relationship between the variables. General government expenditure has a significant positive long-run impact on economic growth, while total tax rates have a significant negative long-run impact on growth, concluding that a tax cut could stimulate economic growth. Fosu (2019) used pooled OLS as well as fixed and random effect models to investigate the effects of investment and consumption government expenditures on unemployment in 34 Sub-Saharan African countries over the period 1990-2017. The results revealed that an increase in consumption expenditure results in increasing unemployment, whereas a rise in investment expenditure results in reducing unemployment. The study recommended that governments in these countries should focus on investment public expenditure which has a greater tendency to create jobs than consumption expenditure. Zirgulis and Šarapovas (2017) explored the impact of corporate taxation on unemployment utilizing panel data for 41 countries during the period 2001-2012. They employed a system general method of moments and found that a rise in the effective average corporate tax rate significantly increases unemployment through tax effects on international capital investment. Tagkalakis (2013) examined the unemployment effects of fiscal policy tools in Greece using quarterly data from 2000 to 2012. They applied the Structural Vector Autoregressive (SVAR) methodology and found that a reduction in government consumption and taxes could significantly reduce unemployment since a tax hike reduces output and increases unemployment. Finally, Umut (2015) investigated the impact of fiscal policy on the unemployment rates in the Netherlands using the VAR approach and quarterly data. The study concluded that unemployment falls in response to fiscal expansion since aggregate government spending increase and tax reduction could increase the output and reduce unemployment rates.

4. Government spending, tax revenues, and the unemployment rate in Jordan

Jordan is one of the small economies in the Middle East. Its economy depends mainly on mining, manufacturing, construction, and power generation. Jordan is also one of the large producers and exporters of phosphate in the world. The main industrial products in Jordan are potash, phosphates, cement, clothes, and pharmaceutical products. However, the lack of natural resources, increasing flows of refugees, widespread corruption, excessive bureaucracy, and regional turmoil have

impeded its economic growth and increased unemployment rates and poverty. The annual reports of the Central Bank of Jordan have revealed that agriculture accounts for about 4% of its GDP, mining and manufacturing contribute to 21%, and the services sector constitutes nearly 75% of Jordan's GDP. Figure 1 presents the behaviour of the unemployment rate, tax revenues, and government expenditures in Jordan during the study period. As obvious in this figure, the aggregate government expenditure was volatile during the study period and recorded its peak in 1988, which was attributed to the high increase in both components. It can be noticed that both unemployment rates and tax revenues were low in the same year. After the Jordanian Dinar crisis of 1989, capital government expenditure declined, while current expenditure maintained its level, coinciding with high increases in tax revenues and unemployment rates. Since 1989, Jordan has been committed to successive structural reforms concerned with achieving sustained economic stabilization, reducing all government expenditures, eliminating subsidies on consumer goods, and adjusting the tax structure toward indirect taxation, such as value-added tax, to increase the local revenues (Mishal, 2019; Alrawashdeh et al., 2019). Tax revenues recorded their peak in 1992, coinciding with a noticeable increase in the unemployment rate, which could be attributed to the return of Jordanian expats from Kuwait with their savings and compensations, the migration of Iraqi citizens to Jordan after the Iraqi invasion of Kuwait in 1990, and the increase in both public debt and budget deficit. After the global financial crisis of 2008, both government expenditure components and tax revenues started to decline, while unemployment rates started to soar after 2014, noting that tax revenues were relatively stable during the period 2011-2019.

Fiscal policy is the policy that focuses on the management of government revenues and expenditures with their uses, to achieve the economic, social, and political goals proposed by the government. Public spending is an important tool of fiscal policy as it stimulates economic growth by increasing the productivity of national production factors, especially if directed toward highly effective economic sectors. The Jordanian government targeted fiscal discipline through the approval of the third 5-Year economic development plan proposed by the Ministry of Planning and International Cooperation during the period 1986-1990. However, the desired outcomes were not met due to the lack of Arab countries' financial aid, the continuous decline in local revenue growth rates, and the failure in reducing current government spending. In fact, current government expenditure was soaring during the period 1987-1991, which exerted a negative impact on capital expenditure. Therefore, Jordan requested the financial support of the International Monetary Fund (IMF) and World Bank, then signed the first agreement with IMF that entailed the first financial and fiscal reform over the period 1989-1993. Current government spending increased considerably in 2011 as a result of raising subsidies on consumer goods and energy. Consequently, in 2012, the government enforced strict austerity measures in order to control its current expenditure (Adeinat, 2020). After all, both government spending components reduced considerably after 2012. It is so obvious that the ratio of current government expenditure to GDP was much higher than that of capital expenditure during the entire study period, reflecting the inflated size of the Jordanian government.

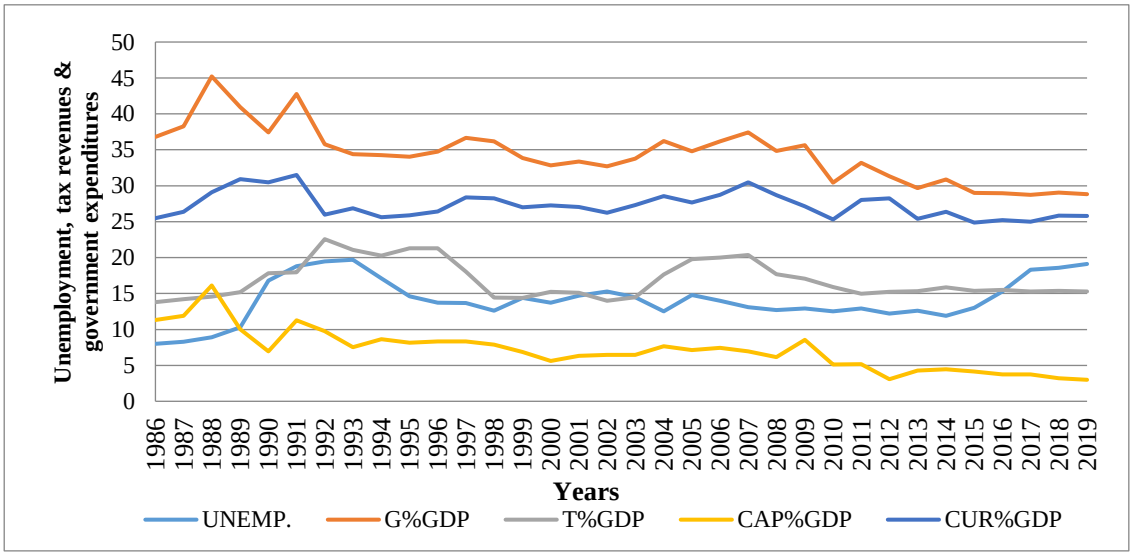

Figure 1: The behaviour of unemployment rate, tax revenues and government expenditures in Jordan during the study period. (Source: prepared by researcher)

5. Data, variables' description and methodology

The data used in this study is annual data and covers the period 1986-2019. The study period depends on data availability for all variables, noting that the year 2020 was excluded from the sample to avoid the adverse consequences of Covid-19 on unemployment rates. The data was extracted from bulletins and statistical reports issued by the Department of Statistics, Central Bank of Jordan, and the Ministry of Finance. Variables' description according to the literature and previous studies is as follows:

UNEMP (dependent variable): Unemployment rate which is the number of unemployed persons as a percentage of the labor force. The labor force is the number of people who are at or above the working age of 16, either employed or actively looking for work (AlSebti, 2019). The unemployment rate reflects the inability of a country to create employment opportunities for the persons who are willing and seeking work.

The independent variables: 1) G: Aggregate government expenditure which is defined as all government final consumption, investment, and transfer payments. It is measured by aggregate government expenditure as a percentage of GDP. 2) T: Tax revenues which are defined as the funds collected by the government as taxes on income and profits of individuals and enterprises, in addition to taxes on trade. This variable is measured by tax revenues as a percentage of GDP. 3) CUR: Current government expenditure that represents the government's final consumption of goods and services. It is measured by current government expenditure as a percentage of GDP. 4) CAP: Capital government expenditure that represents the government's gross capital formation. It is measured by capital government expenditure as a percentage of GDP.

The study followed the approach adopted by some previous studies such as (Tagkalakis, 2013; Saraireh, 2020; Omran and Bilan, 2020; Obayori, 2016; Umut, 2015; Fosu, 2019) in order to estimate the following econometric equations for examining the impact of fiscal policy instruments on unemployment rates in Jordan:

$$UNEMP_t = \alpha_0 + \alpha_1 T_t + \alpha_2 G_t + \varepsilon_t \qquad (1)$$

$$UNEMP_t = \beta_0 + \beta_1 T_t + \beta_2 CAP_t + \beta_3 CUR_t + e_t \quad (2)$$

Where t represents the time or year, β_0 & α_0 represent the intercepts, ε_t & e_t represent the random error terms, β_1 up to β_3, α_1 and α_2 are the coefficients to be estimated, and all variables are described above. Based on the Keynesian macroeconomic theory and endogenous economic growth models, both government expenditure components stimulate economic growth, and hence create employment opportunities, whereas an increase in tax revenues decreases enterprises' profits and hence increases unemployment rates. Accordingly, these economic theories predict negative signs for α_2, β_2 and β_3, and positive signs for α_1 & β_1. The purpose of this study is to test the following main hypotheses**:**

H_{o1}: There is no significant impact of current government expenditure on unemployment rates in Jordan.

H_{o2}: There is no significant impact of capital government expenditure on unemployment rates in Jordan.

H_{o3}: There is no significant impact of tax revenues on unemployment rates in Jordan.

6. Econometric results

Multicollinearity is the existence of high intercorrelations among the independent variables, resulting in misleading outcomes. As seen in Table 1, the multicollinearity problem does not actually exist since the correlation coefficients between the explanatory variables are very low (not close to 1 or -1). It can be noticed that the unemployment rate has a positive correlation with tax revenues and negative correlations with both government expenditure components.

Table 1. Correlation matrix

	UNEMP	T	CAP	CUR	
UNEMP	1	0.4241	-0.3646	-0.1177	
T	0.4241	1	0.1617	0.1328	
CAP	-0.3646	0.1617	1	0.3855	
CUR	-0.1177	0.1328	0.3855	1	

Source: Calculated by researcher

The existence of the unit root in the study variables was tested using the Augmented Dickey-Fuller (ADF) unit root test proposed by Dickey and Fuller (1979) in order to avoid the spurious regression caused by non-stationary variables. The results of this test are illustrated in Table 2 which clarifies the stationarity of current government expenditure (CUR) and tax revenues (T). These variables are integrated of order zero I(0), because the probability values are less than 0.05 at the level with constant and constant & trend, indicating the rejection of the null hypothesis of the existence of unit root at the level. On the other hand, capital government expenditure (CAP), aggregate government expenditure (G), and the unemployment rate (UNEMP) are stationary at the first difference I(1), because the probability values are less than 0.05, only at the first difference with both constant and constant & trend, resulting in rejecting the null hypothesis of the existence of the unit root at the first difference.

Table 2: ADF test results

Variable	level				First difference			
	Constant		Constant & trend		Constant		Constant & trend	
	t- statistic	Prob.	t- statistic	Prob.	t- statistic	Prob.	t- statistic	Prob.
UNEMP	-2.9879	0.0468	-2.9311	0.1667	-3.9279	0.0050	-3.8663	0.0256
G	-1.2285	0.6497	-3.0113	0.1448	-7.4908	0.0000	-7.3019	0.0000
CAP	-2.8449	0.0637	-4.1145	0.0145	-9.4575	0.0000	-9.6794	0.0000
CUR	-2.9716	0.0480	-3.5705	0.0482	-		-	
T	-3.2088	0.0297	-5.8962	0.0002	-		-	

Source: The researcher's calculations

Based on Akaike Information Criterion (AIC), the optimal lag number utilized in the ARDL model can be determined by using the VAR approach. The results in Tables 3 and 4 revealed that the optimal lag number for equation 1 is two, while the optimal lag number for equation 2 is three.

Table 3: The selection of optimal lag number for equation 1

Lag	LogL	LR	FPE	AIC	SC	HQ
0	203.58	NA	3.13E-10	-13.372	-13.23188	-13.32718
1	243.644	69.44423	3.96E-11	-15.44294	-14.88246*	-15.26363
2	258.48	22.74848*	2.74e-11*	-15.8320*	-14.85116	-15.51822*
3	265.5173	9.383131	3.30E-11	-15.70116	-14.29996	-15.2529

Source: researcher's calculations. * indicates the optimal number of lags.
LR: sequential modified LR test statistic. FPE: Final Prediction Error. AIC: Akaike Information Criterion. SC: Schwarz Information Criterion. HQ: Hannan-Quinn information criterion.

Table 4: The selection of optimal lag number for equation 2

Lag	LogL	LR	FPE	AIC	SC	HQ
0	311.3873	NA	2.87E-14	-19.83144	-19.64641	-19.77112
1	361.058	83.3186	3.30E-15	-22.00374	-21.0785*	-21.70216
2	383.3487	31.63842*	2.33e-15*	-22.40959	-20.74432	-21.8667*
3	401.2587	20.79868	2.40E-15	-22.5328*	-20.12742	-21.74872

Source: researcher's calculations. * indicates the optimal number of lags.

The study variables are integrated with different orders, accordingly, the appropriate estimation method to be applied is the ARDL model suggested by Pesaran and Shin (1998). The ARDL Bounds Cointegration test was applied for both equations, and the results are presented in Tables 5 & 6, which confirm the existence of a cointegrated long-run relationship between the study variables for both equations. The value of calculated F-statistics (5.0613) in Table 5 is greater than the critical value for the I1 bound at a 5% significance level, while the calculated F-statistics (6.9281) in Table 6 is greater than all critical values for the I1 bound, concluding the rejection of the null hypothesis of the non-existence of cointegration for both equations.

Table 5: ARDL Bounds Cointegration test for equation 1

Test Statistic	Value	
F-statistic	5.0613	
Critical Value Bounds		
Significance	I0 bound	I1 bound
10%	3.17	4.14
5%	3.79	4.85
2.50%	4.41	5.52
1%	5.15	6.36

Source: The researcher's calculations

Table 6: ARDL Bounds Cointegration test for equation 2

Test Statistic	Value	
F-statistic	6.9281	
Critical Value Bounds		
Significance	I0 bound	I1 bound
10%	2.72	3.77
5%	3.23	4.35
2.50%	3.69	4.89
1%	4.29	5.61

Source: The researcher's calculations

The ARDL approach assumes that the dependent variable is a function of its lagged values, in addition to the current and lagged independent variables. For example, this approach can be applied by estimating the following model (3) for equation 2:

$$\Delta UNEMP_t = \sigma_0 + \sigma_1 UNEMP_{t-1} + \sigma_2 T_{t-1} + \sigma_3 CAP_{t-1} + \sigma_4 CUR_{t-1} + \sum_{i=1}^{p} \theta_{1i}\ \Delta UNEMP_{t-i} + \sum_{i=0}^{q1} \theta_{2i}\ \Delta T_{t-i} + \sum_{i=0}^{q2} \theta_{3i}\, \Delta CAP_{t-i} + \sum_{i=0}^{q3} \theta_{4i}\, \Delta CUR_{t-i} + €_t \quad (3)$$

$UNEMP_{t-1}$: lagged dependent variable.

p, q_1, q_2, q_3: represent the upper limit of the number of lags.

σ_0: represents the intercept. €: random error term.

σ_1 up to σ_4: represent the parameters of long-run relationships.

θ_1 up to θ_4: represent the parameters of short-run relationships

The results of ARDL cointegrating and long-run form for equations 1 & 2 are displayed in Tables 7 & 8. Each table is divided into two sections; the first one presents the estimated short-run coefficients in addition to the coefficient of error

correction term, whereas the second section presents the estimated long-run coefficients. As shown in Table 7, the aggregate government expenditure (G) is found to have significant negative short and long-run relationships with an unemployment rate at 5% and 1% significance levels respectively. In other words, the increase in such expenditure causes the unemployment rate to decline in the short and long run, whereas a 1% increase in this expenditure causes the unemployment rate to decline by about 0.31% in the long run. This result is consistent with the Keynesian macroeconomic theory and the outcomes of some previous studies such as (Saraireh, 2020; Obayori, 2016; Monacelli et al., 2010; Omran and Bilan, 2020; Umut, 2015). On the other hand, tax revenues (T) have insignificant positive short and long-run impact on unemployment rate, which is consistent with the outcomes of some previous studies such as (Colombier, 2009). The coefficient of error correction term is statistically significant at a 5% significance level with the anticipated negative sign, indicating the validity of the long-run equilibrium relationship. Obviously, 46% of the disequilibrium of the unemployment rate in the current year would be adjusted back to the long-run equilibrium in the next year. Moreover, the coefficient of determination (R-squared) indicates that 79% of the variation in the unemployment rate is explained by the estimated model. The probability of the F-statistic (0.0000) confirms the significance of the model and its goodness of fit.

Table 7: ARDL cointegrating & long-run form for equation 1

Dependent variable: UNEMP. Included observations: 32 after adjustments				
Short-run coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(UNEMP(-1))	0.6008	0.2186	2.7483	0.0105
D(T)	0.2020	0.1902	1.0621	0.2976
D(G)	-0.1423	0.0645	-2.2062	0.0452
CointEq(-1)	-0.4645	0.2053	-2.2619	0.0320
Long-run coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
T	0.4349	0.2514	1.7304	0.0950
G	-0.3065	0.0996	-3.0762	0.0048
C	0.1756	0.0577	3.0413	0.0052

Source: The researcher's calculations. R-squared= 0.79, Adjusted R-squared= 0.74. F-statistic= 15.1304. Prob. (F-statistic)= 0.0000. Durbin-Watson statistic= 2.02

Table 8: ARDL cointegrating & long-run form for equation 2

Dependent variable: UNEMP. Included observations: 31 after adjustments				
Short-run coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(UNEMP(-1))	0.5435	0.1316	4.1280	0.0006
D(UNEMP(-2))	0.4595	0.1093	4.2024	0.0005
D(T)	0.1931	0.0866	2.2281	0.0382
D(CUR)	-0.5190	0.1705	-3.0428	0.0067
D(CUR(-1))	-0.0774	0.1462	-0.5289	0.6030

Dependent variable: UNEMP. Included observations: 31 after adjustments				
Short-run coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(CUR(-2))	0.4135	0.1308	3.1591	0.0052
D(CAP)	-0.0621	0.1128	-0.5496	0.5890
D(CAP(-1))	-0.4825	0.0818	-5.8934	0.0000
CointEq(-1)	-0.5747	0.0975	-5.8916	0.0000
Long-run coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
T	0.3361	0.1332	2.5221	0.0207
CUR	-1.4275	0.2983	-4.7844	0.0001
CAP	0.3244	0.2069	1.5674	0.1335
C	0.4514	0.0770	5.8595	0.0000

Source: The researcher's calculations. R-squared= 0.89, Adjusted R-squared= 0.81. F-statistic= 10.4168. Prob. (F-statistic)= 0.0000. Durbin-Watson statistic= 2.3

As obvious in Table 8, tax revenues (T) have significant positive short and long-run relationships with the unemployment rate at a 5% significance level, where a 1% increase in such revenues causes the unemployment rate to increase by about 0.34% in the long run. This result is consistent with the Keynesian macroeconomic theory and the outcomes of some previous studies such as (Zirgulis and Šarapovas, 2017; Omran and Bilan, 2020; Tagkalakis, 2013; Umut, 2015). While capital government expenditure (CAP) has a significant negative short-run impact on the unemployment rate, it has an insignificant long-run impact, which is compatible with the outcomes of some previous studies such as (Abouelfarag and Qutb, 2021). The current government expenditure (CUR) is found to have significant negative short and long-run effects on the unemployment rate at a 1% significance level, where a 1% increase in this expenditure causes the unemployment rate to decline by 1.4% in the long run. This result is consistent with the Keynesian macroeconomic theory and the outcomes of some previous studies such as (Obayori, 2016; Umut, 2015). There is also a significant positive short-run impact for current government expenditure on the unemployment rate at a 1% significance level, which could be attributed to the crowding-out effect and distortionary taxes. The coefficient of error correction term is statistically significant at a 1% significance level with the anticipated negative sign, indicating the validity of the long-run equilibrium relationship. Obviously, 57% of the disequilibrium of the unemployment rate in the current year would be adjusted back to the long-run equilibrium in the next year. Moreover, the coefficient of determination (R-squared) indicates that 89% of the variation in the unemployment rate is explained by the estimated model. The probability of F-statistic (0.0000) confirms the significance of the model. Based on the estimated long-run coefficients of the second model, the hypotheses H_{o1} and H_{o3} are rejected, while H_{o2} is accepted.

The parameters stability and changes in data structure were tested for both models through the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) tests proposed by Borensztein et al. (1998), with results illustrated in figures 2, 3, 4, and 5. The line chart for both tests lies within the two red lines that represent the critical bounds at a 5% significance level, indicating the stability of the estimated parameters as well as the non-existence of the structural break in both models. Residual tests were also conducted for both models with results displayed in Table 9, where all probability values for all tests are greater than 0.05, indicating the acceptance of all null hypotheses mentioned in this table.

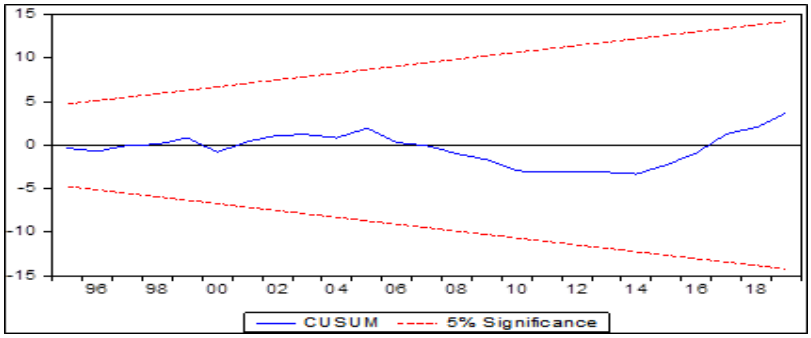

Figure 2: CUSUM test for model 1.

Source: prepared by researcher

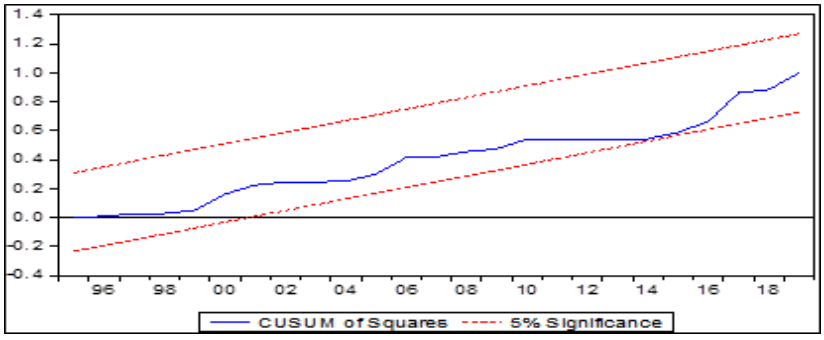

Figure 3: CUSUMQ test for model 1.

Source: prepared by researcher

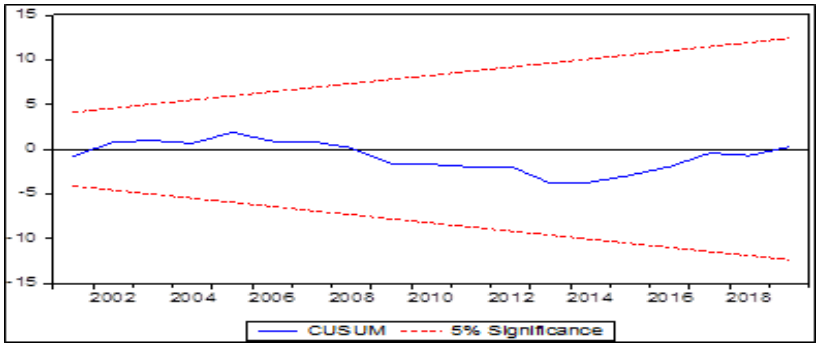

Figure 4: CUSUM test for model 2.

Source: prepared by researcher

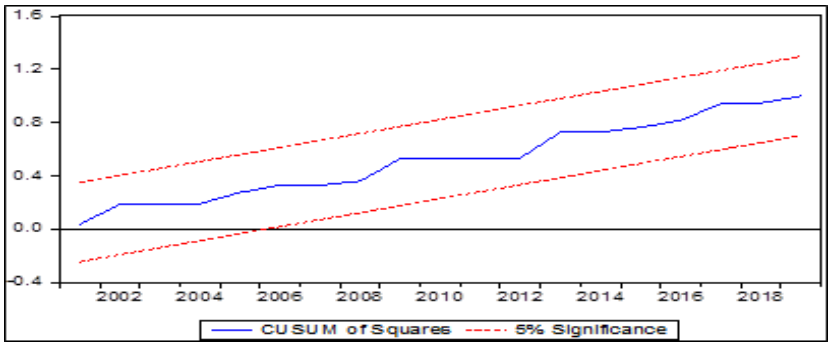

Figure 5: CUSUMQ test for model 2.

Source: prepared by researcher

Table 9: Residual tests

Tests for model 1	**Statistics**	**Prob.**	**Null hypotheses**
Breusch-Godfrey serial correlation LM test	2.3212	0.1207	No serial correlation
Jarque-Bera normality test	0.7276	0.6950	Normal distribution
Breusch-Pagan-Godfrey heteroskedasticity test	1.2360	0.3218	No heteroskedasticity
Tests for model 2	**Statistics**	**Prob.**	**Null hypotheses**
Breusch-Godfrey serial correlation LM test	1.2167	0.3207	No serial correlation
Jarque-Bera normality test	0.9051	0.6360	Normal distribution
Breusch-Pagan-Godfrey heteroskedasticity test	0.9509	0.5176	No heteroskedasticity

Source: Calculated by the researcher

The Granger Causality test proposed by Granger (1969) is usually performed to determine whether one variable is essential for causing and forecasting the other variables. As obvious in Table 10, there is a unidirectional causality running from tax revenues (T) to the unemployment rate (UNEMP) because the P-value is less than 5% for the first null hypothesis which means the rejection of such hypothesis, while the probability value is more than 5% for the second null hypothesis, indicating the acceptance of such hypothesis and the ability of tax revenues to cause and predict changes in the unemployment rates. There is also a unidirectional causality running from the current government expenditure (CUR) to the unemployment rate (UNEMP) since the P-value is less than 5% for the 7th null hypothesis which means the rejection of such hypothesis, while the probability value is more than 5% for the 8th null hypothesis, indicating the acceptance of such hypothesis and the ability of current government expenditure to cause and predict changes in unemployment rates.

Table 10: Granger Causality test

Null hypothesis	**F-Statistic**	**P-value**
1- T does not Granger cause UNEMP	5.1167	0.0300
2- UNEMP does not Granger cause T	0.7786	0.6470
3- G does not Granger cause UNEMP	1.3164	0.3812
4- UNEMP does not Granger cause G	0.8239	0.6191
5- CAP does not Granger cause UNEMP	1.2855	0.3927

Null hypothesis	F-Statistic	P-value
6- UNEMP does not Granger cause CAP	0.3615	0.9173
7- CUR does not Granger cause UNEMP	5.9803	0.0206
8- UNEMP does not Granger cause CUR	2.1868	0.1766

Source: Calculated by researcher

7. Conclusions and recommendations

This study aimed at investigating the impact of some fiscal policy instruments on unemployment rates in Jordan during the period from 1986 to 2019. The results of ARDL estimation for the first model have revealed that the aggregate government expenditure has significant negative short and long-run effects on the unemployment rate, while tax revenues have an insignificant short and long-run impact during the study period, concluding that the increase in such expenditure reduces unemployment rate in the short and long-run. The results of estimation for the second model have ensured that tax revenues have a significant positive short and long-run impact on the unemployment rate. The current government expenditure is found to have significant negative short and long-run effects on unemployment rates, whereas capital government expenditure has only a significant negative short-run impact, concluding that capital spending has a minor share in aggregate government expenditure as well as investing in capital-intensive industries. It could be also inferred that expansionary fiscal policy reduces unemployment rates in Jordan.

Based on the previous outcomes, the study recommends applying an expansionary fiscal policy as it plays a significant role in the unemployment rate reduction. Moreover, in order to increase the long-run effectiveness of capital public spending in reducing the unemployment rate, the government should increase and strengthen governance in executing investment projects and increase the share of capital public expenditure in total public spending by blocking waste, merging some public agencies and departments that have similar functions, enhancing transparency, fighting financial and administrative corruption, in addition to directing public funds to more productive investments. It is also very crucial to apply a comprehensive tax reform represented by broadening the tax base, eliminating tax exemptions and tax holidays, simplifying tax laws and procedures, and terminating tax evasion and tax avoidance in order to increase tax revenues, improve tax compliance, then utilize such revenues in executing the most productive public investments.

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