

TAX BUOYANCY IN JORDAN: MEETING THE CHALLENGE AFTER COVID-19

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Abstract

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Public finance in Jordan has always been poor. Indeed, not a single Jordanian government has managed to have a surplus in its budget. In addition, and within the context of the already high, and rising public debt, COVID-19 will not only exacerbate this problem even further. This is why the main purpose of this paper is to estimate tax buoyancy in Jordan. This is a timely issue to examine because once the Jordanian economy goes back to its normal growth rates (after COVID-19), the status of the fiscal deficit (and public debt) will depend, to a large extent, on tax buoyancy. To estimate the impact of Gross Domestic Product (GDP) on tax revenues (tax buoyancy), the paper uses annual data (1992-2019) and time series techniques including stationarity tests, Johansen cointegration test, and vector error correction model (VECM). Based on the empirical estimations, one can state that tax buoyancy in Jordan is less than one. This indicates that once the Jordanian economy goes back to its pre-COVID-19 growth rates, the increase in total tax revenues will not reciprocate the increases in GDP. This is unfortunate, given the already high existing public debt level. However, what is encouraging is the fact that sales tax and corporate tax are buoyant. The only way to increase tax buoyancy (and total tax to GDP ratio) is to make the sources of tax revenues more diversified and more progressive.

Keywords: Jordan, Tax Buoyancy, GDP, Vector Error Correction Model, Budget Deficit, Public Debt

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1. INTRODUCTION

While the eventual impact of COVID-19 on the performance of the Jordanian economy is still to be seen, the signs are already clear. For example, the International Monetary Fund (IMF) estimates that real GDP will witness a drop of 5 percentage points in 2020. In addition, the overall unemployment rate in Jordan has already increased from 19.1 percent in 2019 to 24.7 percent by the end of 2020 (Department of Statistics, <http://dosweb.dos.gov.jo/>).

The status of public finance in Jordan will be hard hit. Indeed, with falling local revenues and rising expenditures, the budget deficit will widen. Based on the available data, the budget deficit to GDP ratio will rise from 5.8 percent in 2019 to around 9.8 percent in 2020. In addition, the recently increasing public debt to GDP ratio will increase even further, and surpass the 107 percent mark in 2020.

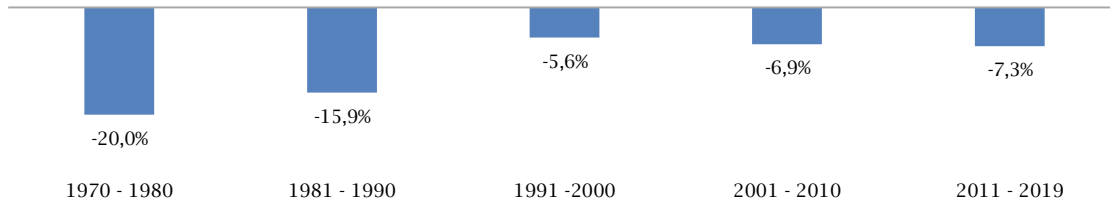
Once life goes back to normality, positive real GDP growth rates will return. However, an important issue in this context is the extent to which the new

normal economic growth would reduce both the fiscal deficit and public debt. Naturally, and from the side of public revenues, the answer depends on the buoyancy of the tax system. In a buoyant system, increases in GDP result in more than proportionate increases in tax revenues. In other words, a buoyant tax system reduces fiscal deficits, and, in the long run, maintains the status of public finance on a sustainable path.

Following an examination of public finance in Jordan, one can make the following four main observations.

First, since the fiscal year 1970, all Jordanian governments have had to live with budget deficits (Figure 1). Since 1990, however, while still large, the witnessed deficits have been much lower than in 1970-1990.

Figure 1. Budget deficit to GDP ratio

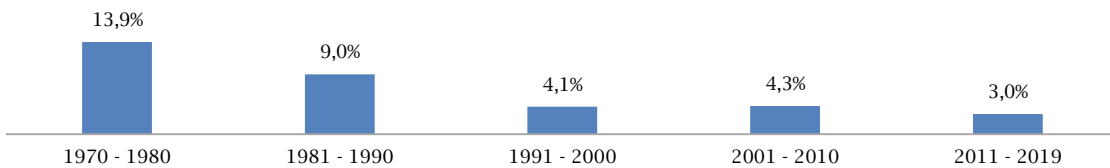


Source: Ministry of Finance (<http://www.mof.gov.jo/>)

Second, all Jordanian governments have been recipients of foreign grants from Arab and foreign governments (Ministry of Finance, <http://www.mof.gov.jo/>). During the period 1970-1980 and 1981-1990, the mean annual grants to GDP ratio was equal to 13.0 percent and

9.0 percent respectively. While still significant, the inflow of this capital has become much lower in recent years. There is no doubt that these grants have been instrumental in reducing the extent of the budget deficits. However, they could not cause a surplus in all previous budgets.

Figure 2. Foreign grants to GDP ratio



Source: Ministry of Finance (<http://www.mof.gov.jo/>)

Third, since 1970, the total public spending to GDP ratio has been decreasing (Ministry of Finance,

<http://www.mof.gov.jo/>). However, this decrease has come at the expense of capital spending (Table 1).

Table 1. Public spending to GDP ratio

Period	Total spending	Capital spending	Current spending	Local revenues
1970-1980	34.6%	10.6%	24.0%	17.5%
1981-1990	36.9%	11.8%	25.0%	23.6%
1991-2000	33.3%	7.7%	25.6%	29.7%
2001-2010	31.0%	6.1%	24.9%	26.6%
2011-2019	28.3%	3.9%	24.5%	22.3%

Finally, the total tax revenues to GDP ratio have increased from 7.9 percent in 1970 to 14.8 percent in 2019 only. In addition, it is useful to note that Jordan's tax revenues to GDP ratio are low (see Figure 3). Even the Tunisian ratio (22.8 percent),

never mind the Danish ratio (46.1 percent) is higher (see Figure 4). What is interesting, however, is the fact that sales tax in Jordan makes up a much larger proportion of total tax revenues than in other countries.

Figure 3. Total tax revenues to GDP ratio

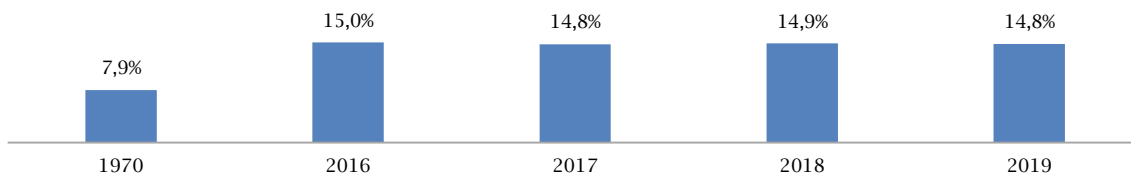
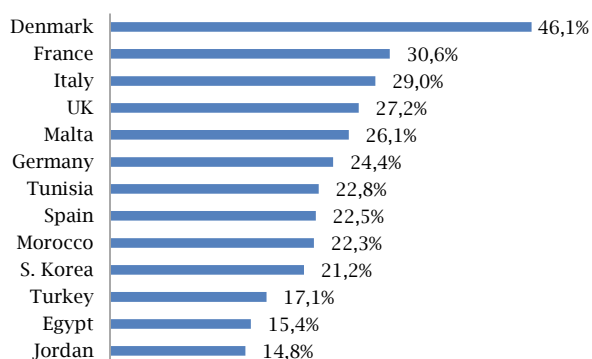
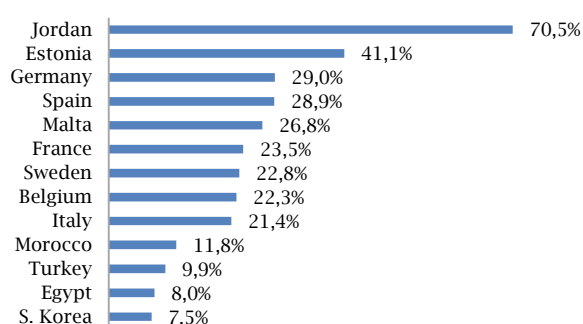


Figure 4. Tax revenues to GDP ratio

Source: Eurostat (<https://ec.europa.eu/eurostat>)

Figure 5. Sales tax to total tax revenues

Source: Eurostat (<https://ec.europa.eu/eurostat>)

Based on the above-mentioned observations, no one can argue that the status of public finance is not peculiar. Public finance generates limited revenues, and this is why public spending is also low. This fact makes the issue of tax buoyancy even more important to examine in the Jordanian scene.

Within the context of the economic implications of COVID-19, and the status of public finance in Jordan, the primary objective of this paper is to estimate tax buoyancy in Jordan and to outline some recommendations which objective is to enhance this measure.

The rest of the paper is organized as follows. In Section 2, we briefly review the literature. In Sections 3 and 4, we discuss the data and methodology, present and discuss the estimated results respectively. Finally, we summarize the findings and conclude the paper in Section 5.

2. TAX BUOYANCY: A BRIEF LITERATURE REVIEW

Tax buoyancy is a simple measure of the efficiency of the revenue mobilization process of any economy. In a buoyant tax system, when GDP increases by 1 percent, tax revenues increase by more than 1 percent, and vice versa. Within this context, it is useful to note that tax buoyancy has short-run and long-run aspects as well. In the short-run, if buoyancy is greater than unitary, the tax system has good built-in automatic stabilizers. In the long run, tax buoyancy that exceeds one can lead to reductions in the budget deficit (Belinga, Benedek, de Mooij, & Norregaard, 2014).

The empirical literature is simply too large to review. Numerous papers that examine tax buoyancy using cross-country and single-country data are available in the published literature. In the case of cross-country data, the literature uses panel data techniques. In the case of single-country data, the literature uses an error correction model (ECM) that simultaneously estimates the short-run effects, long-term relationships, and speed of adjustment.

Some of the early papers that examined tax buoyancy include Sobel and Holcombe (1996), Upender (2008), Bruce, Fox, and Tuttle (2006), and Poghosyan (2011), Cotton (2012), and Belinga et al. (2014). For example, Belinga et al. (2014) estimate the short-run and long-run tax buoyancy in the OECD economies during the period 1965-2012. Their results indicate that for total tax revenues, tax buoyancy in the short-term is not different from one. In addition, they argue that tax buoyancy has increased since the late 1980s, and this indicates that the tax systems in the OECD countries have improved their built-in automatic stabilizers. As far as the long-term buoyancy is concerned, Belinga et al. (2014) report that it is more than one in more than half of the examined countries. Again, this implies that GDP growth rates in these countries improve their "structural fiscal deficit ratios". Finally, Belinga et al. (2014) state that corporate taxes are the most buoyant.

More recent papers include Bayu (2015), Bekoe, Danquah, and Senahey (2016), Deli, Rodriguez, Kostarakos, and Varthalitis (2018), Dudine and Jalles (2018), Sheefeni, Shikongo, Kakuja-Matundu, and Kaulihowa (2019), Al-tarawneh, Khataybeh, and Alkhalwaldeh (2020), Gupta and Liu (2020), Lagravinese, Liberati, and Sacchi (2020). For example, Bayu (2015) estimates the buoyancy of the Ethiopian direct and indirect taxes and foreign trade taxes. Based on the period 1974-2010, the results indicate that tax revenues in Ethiopia are not buoyant, and this indicates the need for "enhancing the efficiency of revenue administration by widening the tax net" (Bayu, 2015, p. 182). In addition, Gupta and Liu (2020), using time series and panel data techniques, examine tax buoyancy in 44 Sub-Saharan states. Their results show that buoyancy is more than one in most of these economies. However, in fragile states, buoyancy is less than one "reflecting their institutional weaknesses". Within the context of these empirical papers, it is interesting to note that in a recently published paper, it is stated that "there is considerable potential for raising more revenues from domestic sources in developing countries to finance development, but this would require strong political leadership to overcome resistance from vested interests" (Mullins, Gupta, & Liu, 2020).

3. THE DATA AND METHODOLOGY

To measure tax buoyancy, we regress tax revenues on GDP as follows:

$$TAX_t = \lambda + \beta GDP_t + \varepsilon_t \quad (1)$$

where, TAX is the natural logarithm of total tax revenues and GDP is the natural logarithm of nominal GDP. If total tax revenues are buoyant, the value of the estimated β would be positive and greater than one. ε is the error term, and t refers to

the time period (1992-2019). In addition, we re-estimate equation (1) for each of the main components of total tax revenues (sales tax and corporate tax).

The fact that the paper uses annual time series data, the first step in the analysis is to test the stationarity of the variables. Following this, we then determine the optimal lag structure of the model. We then test for the cointegrating relationship among the variables. Here, we use the Johansen-Masulius procedures (maximum eigenvalue/ λ_{max} and the trace test/ λ_{trace}).

$$\lambda_{max} = -T \log(1 - \lambda_{r+1}) \quad (2)$$

where, the null (0) is $r = g$ cointegrating vectors with ($g = 0, 1, 2, 3, \dots$) against the alternative which is $r \leq g + 1$.

$$\lambda_{trace} = -T \sum_{i=r+1}^k \log(1 - \lambda_i) \quad (3)$$

where, the null (0) is $r = g$ against the general specification $r \leq 1$.

We then estimate a vector error correction model (VECM) which objective is to examine the long-run and short-run relationships between the variables.

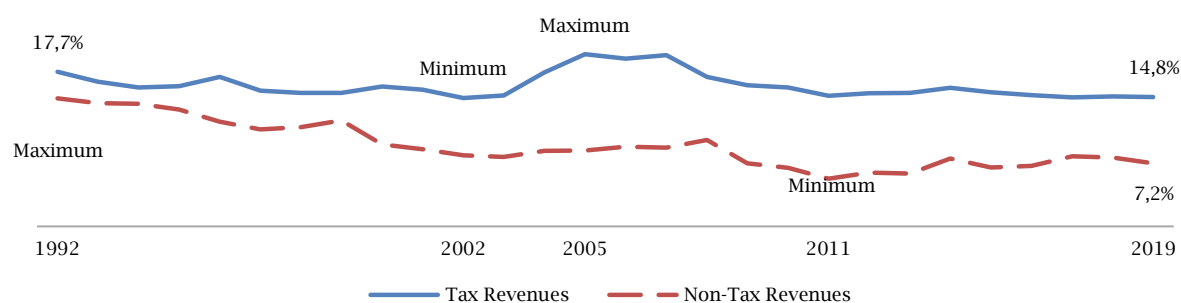
$$\Delta TAX_t = \alpha + \lambda e_{t-1} + \sum_{i=1}^n b_i \Delta GROWTH_{t-i} + \varepsilon_t \quad (4)$$

4. FINDINGS

Before we present the empirical results, it is worth raising a number of comments about the used data (1992-2019).

First, during the period 1992-2019, the tax-to-GDP ratio reached its maximum value in 2015 (19.7 percent). However, since then, it has come down, and by the end of 2019, it hit the 14.8 percent mark. Even more disappointing, however, is the fact that in 1992, this ratio was higher (17.7 percent).

Figure 6. Tax and non-tax revenues to GDP ratio



Second, during the period 1992-2019, the composition of total tax revenues reveals some interesting facts.

1. The ratio of tax revenue from general sales tax to total tax revenues has been increasing. In 1992 and 2019, this ratio increased from 36.9 percent to more than 70 percent in 2019 (Table 2).

2. The ratio of tax from the corporate sector to total tax revenues increased from 14.6 percent

(1992-1996) to 16.8 percent in 2019 (Table 2).

3. The weight of taxes from international trade in total tax revenues has decreased. During the period 1992-1996, taxes from international trade constituted about 52 percent of tax revenues. By the end of 2019, this ratio fell to 5.9 percent only (Table 2). This decrease is due to the World Trade Organization's (WTO) provisions.

Table 2. Composition of tax revenues

Period/Year	General sales	Corporations	International trade	Salaried employees	Individuals
1992-1996	36.9%	14.6%	51.6%	2.9%	4.6%
1997-2001	44.2%	11.2%	30.4%	1.4%	3.7%
2002-2006	56.5%	12.1%	21.8%	1.8%	2.9%
2007-2011	62.7%	17.3%	11.9%	2.0%	2.5%
2012-2016	68.5%	16.1%	8.2%	2.3%	1.9%
2017	68.9%	17.1%	7.0%	3.0%	1.5%
2018	70.2%	16.8%	6.5%	3.3%	1.2%
2019	70.6%	16.8%	5.9%	4.1%	0.9%

4. Income tax from people who earn wages contributes very little towards total tax revenues. However, the weight of this tax source has been increasing (Table 2). Such low proportions of total tax revenues are not surprising given the existing low wages and high tax thresholds. For example, the mean wage in Jordan is 545 Jordanian dinars per month. A single person is exempt from income tax for his or her first 12,000 Jordanian dinars a year. For a married person, the first 18,000 dinars a year

are exempted from tax. These thresholds indicate that few, and only a few, Jordanians who earn a salary actually pay income tax.

5. Finally, the most surprising, if not shocking, an element of the composition of total tax revenues is taxed from "individuals". All private sector entities outside the corporate sector fall under this component, regardless of their profession. These private sector entities are Jordan's micro, small, and medium-sized enterprises (MSMEs). The MSMEs

sector in Jordan contributes very little towards total tax revenues. Relative to any standard, the 0.9 percent of total tax revenues paid by this sector (Table 2) is unbelievable. As one might expect, such low contributions to total tax revenues are the result of inefficiency in tax collection, tax avoidance, tax evasion, and the tax law itself.

As mentioned in the introduction, the objective of this paper is to estimate the buoyancy of the tax system in Jordan. Below, we present and discuss the main results.

First, the results of the unit root test (Dickey-Fuller) show that not all the variables are stationary in their level forms (Table 3). However, they all become stationary when we first-difference them.

Table 3. Augmented Dickey-Fuller unit root test

	<i>None</i>	<i>Constant</i>	<i>Constant & Trend</i>	<i>None</i>	<i>Constant</i>	<i>Constant & Trend</i>
GDP	1.187	-0.656	-1.811	-1.102*	-2.976*	-2.573*
Tax revenues	2.14	-0.963	-1.839	-1.780*	-2.915*	-2.882*
General sales	6.638	-2.802	-0.553	-2.159*	-3.465*	-3.950*
Corporate	2.848	-0.527	-1.604	-3.461*	-4.298*	-4.215*

Note: * Significant at the 99 percent level.

Second, before we perform the Johansen cointegration test, we need to determine the optimal lag length criteria. In Table 4, we report the results of this analysis. It is clear that the optimal lag length

for total tax revenues and GDP is two (2). For sales tax and GDP, the optimal lag length is one (1). For corporate tax and GDP, the length is two (2).

Table 4. VAR models: The results of lag order selection criteria for Jordan

<i>Panel A: Endogenous variables: Total tax revenues & GDP</i>						
<i>Lag</i>	<i>LogL</i>	<i>LR</i>	<i>FPE</i>	<i>AIC</i>	<i>SC</i>	<i>HQ</i>
0	1.182415	NA	0.003670	0.068132	0.166303	0.094177
1	83.85759	144.6816	0.000005	-6.488132	-6.193619	-6.409998
2	93.10539	14.64234*	0.000003*	-6.925449*	-6.434593*	-6.795225*
3	96.21283	4.402216	0.000003	-6.851069	-6.163871	-6.668755
4	97.10851	1.119599	0.000005	-6.592376	-5.708836	-6.357972
<i>Panel B: Endogenous variables: Sales tax & GDP</i>						
0	-9.929205	NA	0.009265	0.994100	1.092272	1.020145
1	80.18043	157.6919*	0.000007*	-6.181702*	-5.887189*	-6.103568*
2	81.21629	1.640121	0.000009	-5.934691	-5.443835	-5.804467
3	84.87269	5.179895	0.000009	-5.906057	-5.218859	-5.723744
4	88.89184	5.023942	0.000001	-5.907654	-5.024113	-5.673250
<i>Panel C: Endogenous variables: Corporate tax & GDP</i>						
0	-14.19163	NA	0.013216	1.349303	1.447474	1.375347
1	56.59516	123.8769	0.000050	-4.216264	-3.921750*	-4.138129
2	62.86641	9.929478*	0.000042*	-4.405534*	-3.914679	-4.275310*
3	66.71281	5.449066	0.000043	-4.392734	-3.705536	-4.210421
4	70.59484	4.852539	0.000046	-4.382904	-3.499363	-4.148500

Notes: * indicates lag order selected by the criterion. LR: Sequential modified LR test statistic (each test at 5% level). FPE: Final prediction error. AIC: Akaike information criterion. SC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

Third, using our estimated lag lengths criteria for each of our models, we examine the long-term cointegrating relationship between the variables. To do this, we use the Johansen multivariate cointegration test.

the trace statistic and the maximum eigenvalue statistic indicate that at least one cointegrating relationships exist between total tax revenues and GDP, sales tax and GDP, corporate tax, and GDP. In other words, there is a long-run relationship in each of these three relationships.

In Table 5, we report the results of this analysis. Looking at this table, one can see that

Table 5. Johansen multivariate cointegration test

<i>Hypothesized No. of CE(s)</i>	<i>Eigen value</i>	<i>Trace statistic</i>	<i>5 percent CV</i>	<i>P-value</i>	<i>Eigen value</i>	<i>Max-eigen statistic</i>	<i>5 percent CV</i>	<i>P-value</i>
<i>Total Tax revenues & GDP</i>								
None*	0.655747	27.26446	15.49471	0.0006	0.655747	26.65947	14.26460	0.0004
At most 1	0.023909	0.604989	3.841466	0.4367	0.023909	0.604989	3.841466	0.4367
<i>Sales tax & GDP</i>								
None*	0.317928	16.00542	15.49471	0.04281	0.317928	17.948137	14.26460	0.0440
At most 1	0.144483	4.057279	3.841466	0.4402	0.144483	4.057279	3.841466	0.2154
<i>Corporate tax & GDP</i>								
None*	0.486811	17.05345	15.49471	0.0289	0.486811	16.67776	14.26460	0.0204
At most 1	0.014915	0.375686	3.841466	0.5399	0.014915	0.375686	3.841466	0.5399

Note: * Significant at the 99 percent level.

Based on these results, we proceed and estimate a VECM for the three relationships. We report

the results of this analysis in Tables 6, 7, and 8 below. These results indicate the following observations.

First, the fact that the error correction term is negative and significant confirms a long-run equilibrium relationship between the GDP and total tax revenues. However, tax buoyancy (+0.975) is less than unitary. In addition, the VECM results indicate that the short-run impact of GDP on tax revenues is not significant. This implies that the tax system in Jordan has no built-in automatic stabilizers. Long-run relationship:

$$\ln(\text{Total tax revenue})_{t-1} = 1.283 + 0.975 * \text{GDP} \quad (5)$$

Table 6. Results of the VECM

Variables	$\Delta \ln(\text{Total tax revenue})$
ECT(-1)	-0.982*
D(Tax revenue)-1	1.030*
D(Tax revenue)-2	0.638*
D(GDP)-1	0.113
D(GDP)-2	0.147
C	-0.075*

Note: * Significant at the 99 percent level.

Second, the fact that the error correction term is negative and significant confirms the long-run equilibrium relationship between the GDP and sales tax revenues. Moreover, tax buoyancy (+1.289) is more than unitary. In addition, the VECM results

Table 7. Results of VECM

Variables	$\Delta \ln(\text{Sales tax})$
ECT(-1)	-0.017*
D(Tax revenue)-1	0.366*
D(GDP)-1	-0.036
C	0.072*

Note: * Significant at the 99 percent level.

indicate that the short-run impact of GDP on tax revenues is not significant. This implies that the tax system in Jordan has no built-in automatic stabilizers. Long-run relationship:

$$\ln(\text{Sales tax})_{t-1} = 9.152 + 1.289 * \text{GDP} \quad (6)$$

Third, the fact that the error correction term is negative and significant confirms the long-run equilibrium relationship between the GDP and corporate tax revenues. Moreover, tax buoyancy (+1.197) is more than unitary. In addition, the VECM results indicate that the short-run impact of GDP on tax revenues is not significant. This implies that the tax system in Jordan has built-in automatic stabilizers. Long-run relationship:

$$\ln(\text{Corporate tax})_{t-1} = 8.370 + 1.197 * \text{GDP} \quad (7)$$

Finally, for each of the three models, we carry out two diagnostic tests (serial correlation and stability). Based on the results, shown in Table 9, we can conclude that the three models do not have serial correlation problems in their respective residuals. In addition, Figures 7, 8, and 9 indicates that all three models are dynamically stable.

Table 8. Results of the VECM

Variables	$\Delta \ln(\text{Corporate tax})$
ECT(-1)	-1.249*
D(Tax Revenue)-1	0.460*
D(Tax Revenue)-2	0.415*
D(GDP)-1	1.692*
D(GDP)-2	0.869*
C	-0.204*

Note: * Significant at the 99 percent level.

Table 9. Breusch-Godfrey serial correlation LM test

<i>Total tax revenues * GDP</i>			
F-statistic	0.513324	Prob. F(2,17)	0.6075
Obs*R-squared	1.423791	Prob. Chi-square(2)	0.4907
<i>Sales tax</i>			
F-statistic	0.883651	Prob. F(1,21)	0.3579
Obs*R-squared	1.049867	Prob. Chi-square(1)	0.3055
<i>Corporate tax</i>			
F-statistic	0.942704	Prob. F(2,17)	0.4090
Obs*R-squared	2.495853	Prob. Chi-square(2)	0.2871

Figure 7. CUSUM test: Tax revenues & GDP

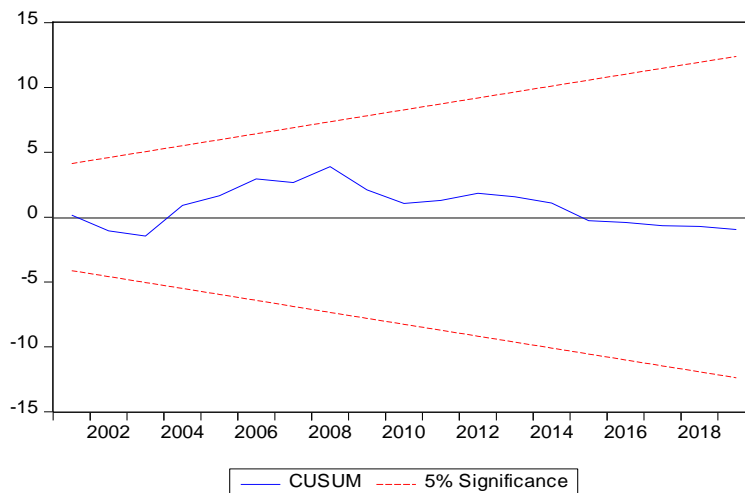


Figure 8. CUSUM test: Sales tax & GDP

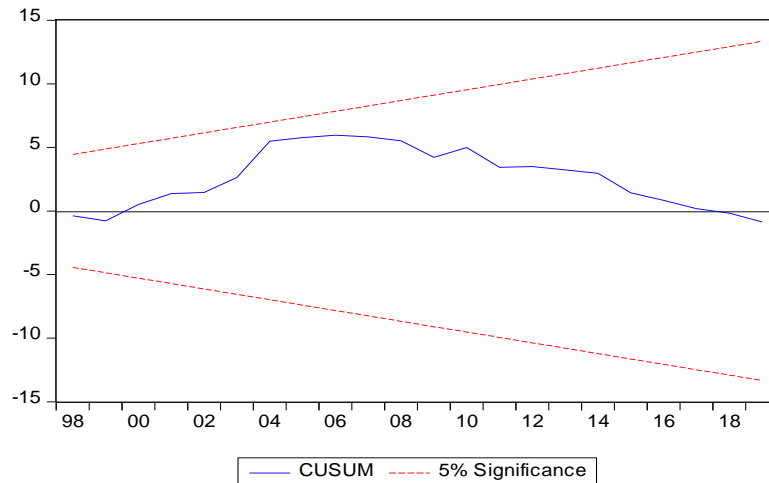
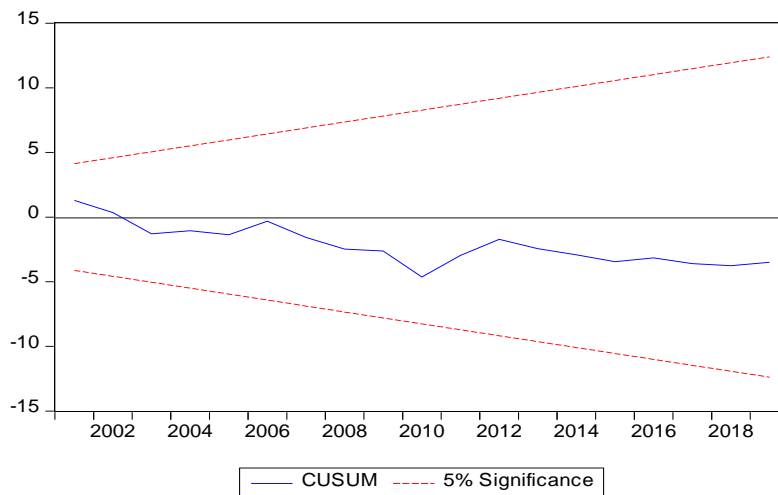


Figure 9. CUSUM test: Corporate tax & GDP



5. CONCLUSION

This paper has examined public finance in Jordan in terms of tax buoyancy. This issue, as mentioned in the introduction, is particularly relevant in Jordan. Due to COVID-19, the falling local revenues and rising expenditures will widen the budget deficit and increase the already high public debt level. Within this context, the extent to which the new normal economic growth would reduce both the fiscal deficit and public debt depends on the buoyancy of the tax system. In a buoyant system, increases in GDP results in more than proportionate increases in tax revenues and vice versa. A buoyant tax system reduces fiscal deficits and, in the long run, maintains the status of public finance on a sustainable path.

Based on the period 1992-2019, and the econometric results, it is unfortunate to note that the tax buoyancy in Jordan is less than one. This indicates that once the Jordanian economy goes back to its pre-COVID-19 growth rates, the increase in total tax revenues will not reciprocate the increases in GDP. This is unfortunate, given the already high existing public debt level.

However, what is encouraging is the fact that sales tax and corporate tax are buoyant. Within this context, the fact that taxes from employees (salaried individuals) and business entities outside the corporate sector (MSMEs), contribute very little towards total tax revenues (about 5 percent), the only way to increase tax buoyancy (and total tax to GDP ratio) is to widen the tax base of these sources and make them more progressive.

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