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Public Debt and Economic Growth: Is There Any Causal Effect? An Empirical Analysis With Structural Breaks and Granger Causality for Jordan

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ABSTRACT

Public debt in Jordan raised because of fiscal expansions. This study investigates whether public debt contributed to the economic growth in Jordan over the period 1980 to 2020. It also investigates whether other indicators of the debt burden, such as external debt service, budget expenditure, and budget deficit, have an influence on economic growth. The results of this study are harmonic with the extant literature that found an inverse relationship between debt burden and growth. The study found that the public debt over time has a negative impact on GDP

1. INTRODUCTION

A nation's economy requires an amount of capital to continue financial improvement and to sustain economic development. In a circumstance when government expenditure exceeds its tax collections, it has a budget deficit, which it finances by borrowing from the domestic sector or international governments (Mankiw, 2013). Economic hypothesis recommends that sensible levels of borrowing for a developing nation are likely to improve Economic growth because it quickens the pace of development infrastructure. Jordan is one of the developing countries and has a budget deficit. Furthermore, since 1980 did not get that there was a surplus in the public budget. From 1980 to 2020, the deficit (before aid) in the budget relative to gross domestic product (GDP) was higher than 20% in 10 years, and between (19.9% - 10%) in 13 years, (9% -5%) In 9 years, and between (4.9% - 1%) in 8 years during that period. When Jordan has a budget deficit, the government borrow from the private sector and foreign governments to finance government expenditure and enhance investment, and, consequently improve economic growth.

Nevertheless, when debt influences negatively on economic growth, it will make Jordan worse off. The accumulation of borrowing becomes a public debt burden, which consists of both domestic and external debts. The exciting rise of debt in developing countries has increased concerns as to whether the borrowings could help to enhance economic growth or whether it could become a burden of responsibility that future generations would have to pay. Lee and Ng (2015) state that the existence of high public debt can have a negative influence on economic development.

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Jordan had fiscal deficits financed by increasing debts during the past decades, which was because of the expansionary fiscal policy to stimulate economic growth through a rise in government spending. The Syrian crisis and Jordan's energy crisis played a significant role in the emergence of the crises in the last years. In recent years, the significant rise in public debt was due to the Syrian refugee crisis, Jordan's energy crisis and the priority of the policymakers to make Jordan a high-income country by the year 2025, in line with the vision 2025 objective. However, Jordan's public debt is considered high, implying that realising the set target in Vision 2025 can be elusive if efforts are not made to decline debt (Jordan's Vision, 2014). Nguyen et al. (2003) argued that the uncertainties of public debt service payment create the challenge in pursuing economic reformation. In Jordan, public debts have continued to increase over time.

To our best knowledge, there are only a few academic researches on debt and economic growth in Jordan (Maghyreh and Omet, 2002; Abdelhadi, 2013; Al-Refai, 2015; Bader and Magableh, 2009; and Al-Fawwaz, 2016). However, their finding is inconsistent. For instance, Maghyreh and Omet (2002), Abdelhadi (2013) and Al-Refai (2015) find that debt has a negating influence on Jordan's long-run economic growth. In contrast, Al-Fawwaz (2016) see that debt has a positive influence on Jordanian economic growth at the aggregate level. New evidence needs to be brought forward to assist in providing a better understanding of the issue. This study attempts to fill the research gap in the literature, to investigate the influence of public debt on economic growth in Jordan. Consequently, this study is carried out to examine the effect of public debt on the economic growth of Jordan.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Literature review shows that several studies have discussed the effect of debt on economic variables, and the conclusions of these studies have been various; some show a positive association, and others found that there is a negative association. Blake (2015) used ARDL approach to study the impact of public debt on economic growth in Jamaica for the period 1990 to 2014 and found that the debt adversely affects economic growth. Another study by Ogawa et al. (2016) used the panel VAR model to test the relation between servicing public debt and economic growth in OECD and 31 European Union countries for the period 1995 to 2013 and found an inverse association between the public debt and economic growth in the long run.

However, Tasos (2014) found no evidence that no causality between public debt effects and growth in Greece; instead, the study found that there are structural breaks in the economy of Greece. In addition, Chiu and Lee (2017) found that an increase in public debt could help to stimulate economic growth. A study by Kim et al. (2017) also found a negative relationship between public debt and economic growth in 77 countries for the period 1990 to 2014. Chudik et al. (2017) study confirmed that the long-term impact of public debt growth had contributed significantly to declining rates of economic growth in the 40 countries during the period 1965-2010. A study by Al-Refai (2015) of the influences of debt on the Jordanian economy during the period (1990-2013). using the ordinary least squares (OLS) method. The results of the study show that the domestic debt and gross fixed capital formation have a positive nexus with economic growth in Jordan, but long-run external debt has a negative effect on economic growth in Jordan. On another study of the external debt on the Jordanian economy, Abdulhadi (2013) found that the positive association between external debt and economic growth in Jordan.

3. RESEARCH METHOD

The study employs time series data spanning covering the period from 1980 to 2020. Data were collected from the World Development Indicators and International Monetary

Fund. The logarithm of RGDP and Debt are used in the empirical analysis. The model is estimated using the annual data.

$$LNRGDP_t = \beta_0 + \beta_1 LND_t + \beta_2 LNBE_t + \beta_3 LNEDS_t + \beta_4 LNBD_t + \mu_t$$

In the debt-growth model, the logarithm of Real Gross Domestic Product (LNRGDP) is the Dependent variable. Whereas, public debt (D) is a Measure expressed as the debt to GDP, which attempts to capture the direct effect of public Debt on economic growth. The effect of the debt burden is captured by including numerous variables, like budget expenditure to GDP (BE), external debt service (EDS) and the budget deficit to GDP (BD). This paper applies the traditional unit root tests which neglect the structural breaks but were commonly utilised in the literature on economic growth, specifically, the Augmented Dicky-Fuller, 1987 (ADF) and Phillips-Perron, 1988 (PP) test. The second kind of unit root test proposed by Zivot-Andrews (1992), this test specifies the unit root tests allowing for introducing structural breaks. Finally, in this paper used Granger causality analysis in order to investigate the relationship between GDP and Debt.

4. RESULTS

Unit Root and Structural Break

A nonstationary variable indicates the presence of a unit root in a time series. In the case of a nonstationary variable, the effect of a possible policy change or a shock on the variable would be permanent. In this study, (ADF), and (PP) tests were used to test the unit root and stationarity of the series. If there is a break in the series, the results of the ADF, and PP unit root tests tend to support the hypothesis that the series has a unit root Perron, (1989). Thus, Zivot and Andrews (1992) developed a single break model unit root tests in which the break date is endogenously determined.

Table 1: ADF and PP Unit Root Tests

Variables	ADF		PP	
	Level	1st Diff.	Level	1st Diff.
	T Statistics	T Statistics	T Statistics	T Statistics
LNRGDP	-1.954	-3.882*	-2.150	-4.428*
LNBE	-2.910	-5.555*	-2.536	-6.015*
LNEDS	-3.766	-4.795*	-4.656	-4.325*
LND	-2.129	-8.564*	-2.011	-8.998*
LNBD	-2.003	-6.419*	-2.813	-6.013*

Note: *, **, *** denotes 1%, 5% and 10% level of significance respectively, Schwarz Information Criteria (SIC) were used in lag selection.

According to the results of the Augmented Dicky-Fuller, Phillips-Perron unit root tests shown in Table 1, it can be seen that the LNRGDP, LNBE, LNBD and LND series, except LNEDS variable, are non-stationary at their level but become integrated and stationary after first difference.

Table 2: Zivot and Andrews Unit Root Test

Variables				Critical Values	
	Model	Break dates	Test Statistics	1%	5%
LNRGDP	A	1988	-5.194	-5.34	-4.93
	C	2015	-4.492	-5.57	-5.08
LNBE	A	2010	-5.934	-5.34	-4.93
	C	2006	-6.417	-5.57	-5.08
LNEDS	A	1996	-2.623	-5.34	-4.93
	C	1981	-3.158	-5.57	05.82
LNBD	A	1992	-4.434	-5.34	-4.93
	C	2017	-4.478	-5.57	-5.08
LND	A	1980	-3.784	-5.34	-4.93
	C	1988	-4.395	-5.57	-5.08

Note: Critical values were obtained from Zivot and Andrews (1992).

According to Table 2 above shows, the results of the Zivot and Andrews unit root test are presented. According to the findings, when the stationarity of LNRGDP, LNBE, LNEDS, LNBD and LND series were examined considering the structural breaks, the test statistics obtained in both Model A (Intercept) and Model C (Intercept and Trend) were smaller (in absolute value) than the critical values. For this reason, it is concluded that all five series had a unit root.

Granger causality

Table 3 Result of Granger causality test.

Null hypothesis:	F-statistics	prob
LND does not Granger Cause LNRGDP	10.531	0.000
LNRGDP does not Granger Cause LND	6.1619	0.006
LNBD does not Granger Cause LNRGDP	0.1018	0.702
LNRGDP does not Granger Cause LNBD	5.5100	0.047
LNBE does not Granger Cause LNRGDP	5.6171	0.015
LNRGDP does not Granger Cause LNBE	3.0427	0.064
LNEDS does not Granger Cause LNRGDP	0.1109	0.630
LNRGDP does not Granger Cause LNEDS	0.6030	0.556

The Granger causality test is conducted to examine the causal relationship between public debt and the Jordanian economic growth. The results showed in Table 3 indicate that there is a statistical evidence of bidirectional causality between public debt and economic growth. The result shows the reveal unidirectional causality between budget expenditure and economic growth. Further, the result also shows the reveal unidirectional causality between budget deficit and economic growth. But, there is no short-run Granger causality between external debt service and economic growth as shown in table 3.

5. CONCLUSION

This study investigates whether public debt committed to Jordan's economic growth during the period 1980 to 2020. The economic growth, as measured by GDP, explains an adverse relationship with the public debt. From the above summary of the findings, it reveals how debt is fundamentally affecting the economic growth in Jordan. It should be kept in mind that debt can also be problematic not only because they can themselves be the source of instability and can have adverse effects on budget and will have their own repercussions on economic growth. Moreover, the Jordan government's efforts should be direct in creating an economic environment that establishes a stable macroeconomic environment with a peaceful political climate, financial discipline and sound fiscal policies to ensure that the public debt accumulated does not overweight future generations. Lastly, the Jordanian government might also need to place more emphasis on borrowing via Islamic bonds, which is borrowing from the public by allowing all participants to share in the real profits.

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