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DOES PUBLIC DEBT IMPEDE FINANCIAL DEVELOPMENT IN JORDAN? SOME MACRO AND MICRO ANALYSES

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ABSTRACT

Purpose- It is acknowledged that banks offer their respective economies a number of services, including the encouragement of savings and allocation of capital to the private and public sectors. Within this context, and given that public debt in Jordan has been increasing at an alarming rate, this paper sets out to answer two questions: First, what is the impact of local public debt on aggregate credit to the private sector? Second, what is the impact of local public debt on bank-level credit to the private sector?

Methodology- To provide an answer to the first question, the paper uses annual data (1982 – 2021) on aggregate bank credit to the private sector, aggregate bank credit to the government, and the discount rate. The applied techniques include stationarity test, optimal lag structure, co-integration, and vector error-correction (VECM) estimation. To answer the second question, the paper uses annual bank level data (2010 – 2021) for all 13 listed Jordanian banks. The fact that this data includes both time series and cross-section elements, panel data analysis is used to measure the impact of bank-level credit to the government on bank-level credit to the private sector.

Findings- At the macro level, the results show that bank credit to the government (bank holdings of government securities) has a significant and negative impact of bank credit to the private sector. At the micro level, the results also show that bank-level lending to the government does affect (negatively) their credit to the private sector.

Conclusion- The results of this paper are not encouraging. Indeed, they indicate that public debt impedes credit to the private sector. The government should look at the status of its public finance and work on reducing its borrowing. In addition, the government should look at the viability of establishing a secondary market for its issued securities.

Keywords: Jordan, public debt, bank credit, diversification, time-series analysis, co-integration.
JEL Codes: E50, E51, E52

1. INTRODUCTION

On 12 July 2023, The United Nations Secretary-General (António Guterres) presented the report "A World of Debt: A Growing Burden to Global Prosperity". In this Report, the Secretary-General issued a "grave warning as global public debt reached an all-time high of $92 trillion in 2022".

From this Report, it is worth noting the following few quotations. First, "global public debt has increased more than fivefold since the year 2000, clearly outpacing global GDP, which tripled over the same time". Second, "the number of countries facing high levels of debt has increased sharply from only 22 countries in 2011 to 59 countries in 2022". Third, "3.3 billion people live in countries that spend more on interest than health or education".

Relative to the UN's 2023 Report, one can also argue that the state of public finance in Jordan is also alarming. Indeed, public debt to GDP ratio has increased from 67.1 percent in 2010 to 106.4 percent in 2021. Such an increase in public debt, one can argue, might have several implications including its impact (negative) on bank credit to the private sector.

The Author thanks the University of Jordan for his 2022/23 sabbatical year. This paper is part of his effort during this year.

This paper provides answers to two questions:

1. What is the impact of local public debt on aggregate (macro) credit to the private sector?

2. What is the impact of local public debt on bank-level (micro) credit to the private sector?

The rest of the paper has three more sections. In section2, we outline a brief review of the crowding-out literature. In section 3, the data and methodology is outlined. In section 4, the results are presented and discussed. Finally, section 5 summarizes and concludes the paper.

2. THE INTERPLAY BETWEEN PUBLIC DEBT AND PRIVATE SECTOR CREDIT

The concept of the crowding-out effect is probably one of the most hotly debated policy issues in economic theory (Buiter, 1977). Indeed, according to the Classical view, when public spending increases or taxes are reduced, public debt increases, and as a result, interest rates increase, and private credit and investments decrease (Palley, 2013). The Keynesian view, on the other hand, argues for a positive relationship between public spending and private investments. In other words, there is no crowding-out effect. This difference, one must state, is due to how these arguments look at various dynamics including the short term and long term, economy being in full employment or underemployment, and whether or not market prices are flexible or rigid.

The Classical argument rests on the claim that due to flexible prices and wage and interest mechanisms, the economy automatically reaches full employment. When public spending increases or taxes are reduced, public borrowing increases, and as a result, interest rates increase, and private credit and investments decrease. In other words, private investment is crowded out of the market due to fiscal policy (Palley, 2013).

The Keynesian argument rests on the claim that due to rigid prices, wages and interests, the economy does not automatically reach full employment. When public spending increases, aggregate demand increases, and as a result, total production accelerates. The increase in demand accelerates economic growth and total revenues, and as a result, more investments are stimulated. In other words, private investment is not crowded out of the market due to fiscal policy (Balcerzak and Rogalska, 2014).

The contrasting views of the Classical and Keynesian economists notwithstanding, it is also interesting to note that while Monetarists and New Classical economists follow the classical view, New Keynesian and Post Keynesian economists argue that the crowding out effect will occur only in the long term (Snowdon and Vane, 2005).

As one might expect, the different and contrasting views on the crowding-out effect have resulted in the publication of numerous empirical papers. This literature includes papers which use single-country data, and cross-country data. As a result, while some papers apply time series models, others use panel data estimation models. On average, the results of this literature vary according to time period and country. In other words, while some papers report the presence of a crowding-out effect, others do not.

Some of the research papers include Nieh and Ho (2006), Basar and Temurlenk (2007), Furceri and Sousa (2011), Cavallo and Daude (2011), Afonso and Sousa (2012), Gjini and Kukeli (2012), Xu and Yan (2014), Anyanwu, et al. (2017), Akpansung (2018), Lidiema (2018), Manda (2019), Lee and Goh, (2019), and many others. For example, Anyanwu, et al. (2017) examined the impact of local public borrowing on private credit in oil-dependent countries (1990 – 2012). Based on their panel data analysis (fixed effects and dynamic OLS-based models), the results indicate that public debt negatively affects private loans, and hence, there is a crowding-out effect.

Some further papers are published by the International Monetary Fund / IMF (2015 and 2017), Manda (2019), Kabir and Flath (2020), Miyajima (2020), Nguyen and Dang (2020), Zhang et al. (2022), Aghughu et al. (2022), Liu et al. (2023), and Ozili (2023). From these papers, it is worth noting the following observations.

1. In Egypt, "low credit reflects crowding out from public sector borrowing, which pushes interest rates up and reduces incentives to lend to the private sector." (IMF 2015).
2. In Nigeria, "lending to the private sector (in 2016-17) was largely crowded out by government borrowing" (IMF, 2017).
3. In China, "both central government debt and local government debt are negatively related to corporate debt" (Zhang et al. (2022).
4. "Based on data from Chinese prefecture-level cities, this paper empirically examines the impact of local government debt on corporate financing from 2006-2018. The results show that government debt financing reduces total corporate debt financing, increases the cost of corporate debt financing, and has a crowding-out effect on corporate debt financing" Liu et al. (2023).

3. THE DATA, METHODOLOGY AND ESTIMATED RESULTS

As mentioned in section 1, this paper attempts to answer two main questions: First, what is the impact of local public debt on aggregate (macro) credit to the private sector? Second, what is the impact of local public debt on bank-level (micro) credit to the private sector?

To examine the impact of public debt on aggregate credit to the private sector, we estimate the following model:

$$\ln(\text{Credit to Private Sector}_t) = \lambda + \beta_1 \ln(\text{Local Public Debt}_t) + \beta_2 \ln(\text{Discount Rate}_t) + \varepsilon_t \quad (1)$$

where, ε is the error term, and t is the time period (1982 – 2021). All variables are measured in their logarithm forms (ln).

The fact that we have time series data, we first examine the stationarity properties of the three variables (dependent and independent). We then determine the optimal lag structure of the model and test for co-integration using the Johansen-Masulius procedures (maximum eigenvalue / λ_{max} and the trace test / λ_{trace}).

λ_{max} is equal to: $-T \log(1 - \lambda_{r+1})$

The null is r = g co-integrating vectors with (g = 0, 1, 2, 3, …) against the alternative which is r ≤ g + 1.

λ_{trace} is equal to: $-T \sum_{i=r+1}^{k} ln(1 - \lambda_i)$

The null is r = g opposite the general specification r ≤ 1.

If there is co-integration, a vector error-correction (VECM) model is estimated to understand the short run and long run relationships between the variables.

$$\Delta\text{Credit to Private Sector}_t = \alpha + \lambda e_{t-1} + \sum_{i=1}^{n} bi\Delta\text{Local Public Debt}_{t-i} + \sum_{i=1}^{n} bi\Delta\text{Discount Rate}_{t-i} + \varepsilon_t$$

Based on the above model, we can conclude that a long-run relationship (convergence) does exist between the variables if the error correction term (λ) is negative and statistically significant.

In addition to the above-mentioned techniques, we finally test the model for serial correlation and stability in the residual terms. The serial correlation test is done using the Breusch-Godfrey Serial Correlation LM test. The stability in the residual terms is done using the CUSUM test ("cumulative sum of the recursive residuals".

As we stated in the introduction, we also examine the impact of local public debt on bank-level credit to the private sector. In this analysis, we use all Jordanian conventional banks (13) and cover the period 2010-2021. In other word, we estimate two basic models:

$$\Delta\text{Credit}_{i,t} = \beta_1\Delta\text{Deposits}_{i,t-1} + \beta_2\text{Bonds}_{i,t-1} + \beta_3\text{Diversification}_{i,t-1} + \beta_4\text{Equity}_{i,t-1-} + \beta_5\text{Size}_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

$$\Delta\text{Credit}_{i,t} = \beta_1\Delta\text{Deposits}_{i,t-1} + \beta_2\text{Bonds}_{i,t-1} + \beta_3\text{Diversification}_{i,t-1} + \beta_4\text{Equity}_{i,t-1-} + \beta_5\text{Size}_{i,t-1} + \beta6\text{GDP}_{t-1} + \beta6\text{Inflation}_{t-1} + \varepsilon_{i,t} \quad (3)$$

where, i refers to the 13 banks and t the period 2010-2021.

All seven variables are defined as follows: ΔCredit is the annual change in bank credit to the private sector, ΔDeposits is the annual change in total bank deposits, Bonds are the holdings of each bank of government securities divided by total assets, Diversification is net commission income divided by total income, Equity is equity capital (book value) divided by total assets, Size is the natural logarithm of total assets (proxy measure of size), GDP is the annual growth rate in real GDP, Inflation is the annual inflation rate.

The Period Seemingly Unrelated Regression / pooled EGLS technique is used in the estimation of models 1 and 2. This method accounts for serial correlation and heteroskedasticity (period) between the residual terms. This is necessary because the data contains a large number of years / the time series element (12 years) relative to the cross-section number (13 banks). In such cases, it is more likely than not, regressions would suffer from serial correlation in their residual terms.

4. THE ESTIMATED RESULTS

Before we present and discuss the estimation results (models 1-3), we first outline few observations about public debt in Jordan in recent years.

First, between 1982 and 1990, total public debt increased at an alarming rate (from 55.2 percent to 222.8 percent of GDP). In fact, the Jordanian government defaulted on its foreign debt in 1989, approached the IMF, and devalued the currency (Dinar) by 50 percent. Between 1990 and 2010, public debt decreased consistently. Finally, since 2010, total public debt has been

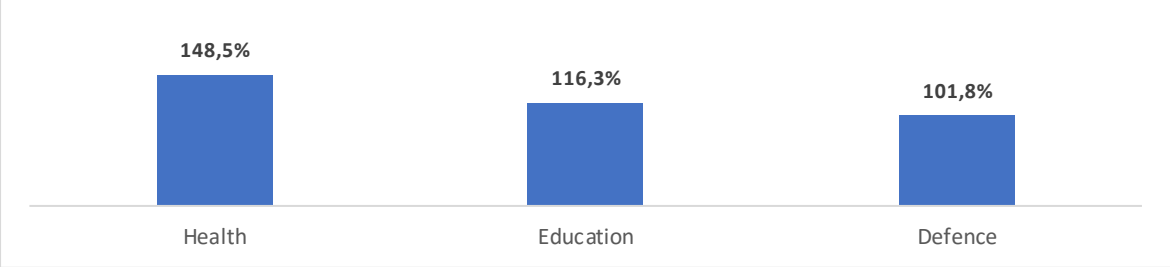
increasing and by the end of 2021, hit 106.2 percent of GDP. It is also relevant to note that the ratio of local public debt to total debt has increased from 19.4 percent in 2000 to 41.4 percent in 2010, and to 62.4 percent in 2021.

Table 1: Total Public Debt to GDP Ratio & its Composition

Year	Total	Local	Foreign
1982	55.2%	16.7%	38.5%
1990	222.8%	37.3%	185.5%
2000	104.7%	19.4%	85.3%
2005	84.3%	26.5%	57.8%
2010	67.1%	41.4%	25.7%
2018	92.9%	52.6%	40.3%
2021	106.2%	62.4%	43.8%
Source: Ministry of Finance Monthly Bulletins.			

Second, the recent increases in public debt are becoming costly. In 2021, for example, interest payments on public debt were more than what was spent on each of health (148.5 percent), education (116.3 percent), and defence (101.8 percent).

Figure 1: Interest Payments to Some Spending Items (2021)



As far as the impact of local public debt on aggregate (macro) credit to the private sector, we report below several observations.

First, the estimation results indicate that all three variables (total credit to private sector, local public debt, and the discount rate) are not stationary in their levels form. Once differenced, however, all three variables become stationary (Table 2).

Table 2: Augmented Dickey-Fuller Unit Root Test

	None	Constant	Constant & Trend	None	Constant	Constant & Trend
Total Credit to Private Sector	-1.419	-2.375	-3.496	-4.315*	-4.932*	-4.836*
Local Public Debt	-1.397	-1.394	-1.328	-2.925*	-3.083**	-3.083**
Discount Rate	0.325	-2.484	-3.126	-4.716*	-4.673*	-4.646*
* and ** imply significance at the 99 and 95 percent levels respectively.						

Second, the optimal lag length for the variables is 1. (Table 3).

Table 3: VAR Lag Order Criteria

Endogenous Variables: Credit to Private Sector, Public Debt, & Discount Rate						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	90.112	NA	3.32e-05	-4.637	-4.551	-4.606
1	103.220	24.145*	2.06e-05*	-5.116*	-4.858*	-5.025*
2	105.423	3.825	2.27e-05	-5.022	-4.591	-4.869
3	108.614	5.207	2.38e-05	-4.979	-4.376	-4.765

Third, the estimation results (trace statistic and maximum eigenvalue) indicate that there are at least two co-integrating relationships (Table 4).

Table 4: Johansen Multivariate Co-Integration Test

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	5 percent CV	P-Value	Eigen Value	Max-Eigen Statistic	5 percent CV	P-Value
Credit to Private Sector, Public Debt, & Discount Rate								
None*	0.496	26.782	14.265	0.001	0.497	26.782	14.264	0.001
At most 1*	0.246	11.008	3.841	0.001	0.260	11.007	3.841	0.001
At most 2	0.027	1.067	3.841	0.302	0.028	1.067	3.841	0.302

Fourth, the results indicate that there is a long-term relationship between credit to the private sector and local public debt and the discount rate. The error correction term is negative (Table 5) and statistically significant (-0.188).

Table 5: Results of the Vector Error Correction Models (VECM)

Variables	ΔIn(Total Credit to Private Sector)
ECT(-1)	-0.188*
D(Total Credit to Private Sector)-1	0.206**
D(Local Public Debt)-1	-0.036
D(Discount Rate)-1	0.103*
C	0.011
* and ** imply significance at the 99 and 95 percent levels.	

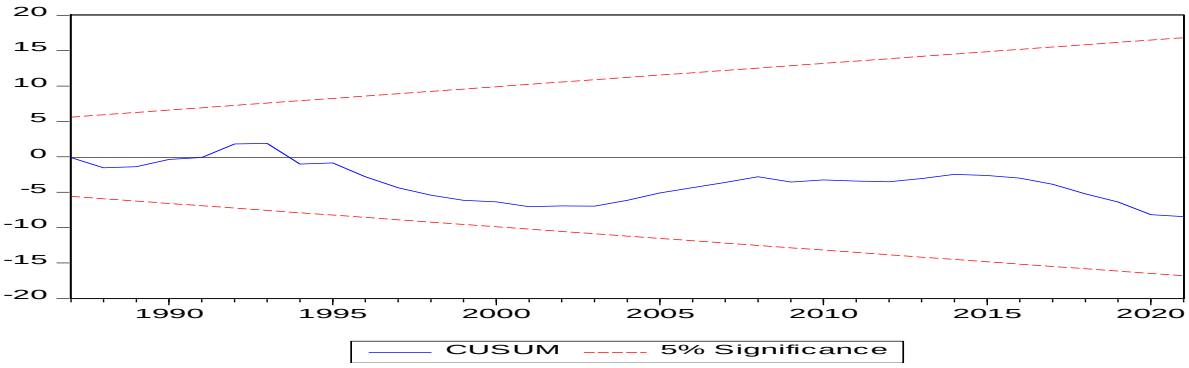
Fifth, in the long run, the impact of local public debt on total bank credit to the private sector is equal to -0.14 and significant. This is an indication of a crowding out effect at the macro level. In the long run, the impact of the discount rate on total bank credit to the private sector is equal to -0.587.

Finally, the model does not suffer from serial correlation (Table 6), and dynamically stable (Figure 2).

Table 6: Breusch-Godfrey Serial Correlation LM Test

Total Credit to Private Sector, Local Public Debt, & Discount Rate			
F-statistic	0.007	Prob. F(1,32)	0.936
Obs*R-squared	0.008	Prob. Chi-Square(1)	0.929

Figure 2: Credit to Private Sector, Public Debt, & Discount Rate



As stated in the first section of this paper, we also examine the impact of local public debt on bank-level (micro) credit to the private sector. In actual fact, and to examine if bank-level data supports the main conclusion about the impact of local public debt on aggregate credit the private sector, we update the data used by Tarawneh et al (2021) to examine the crowding out effect in Jordan. Below, we outline a few observations.

First, bank holding of government securities (treasury bills and government bonds) divided by total assets (bonds) is the most interesting variable. While the overall mean of this measure is equal to 20.9 percent, its maximum value is equal to 36.6 percent. These values reflect that licensed banks in Jordan invest heavily in the issued government financial securities.

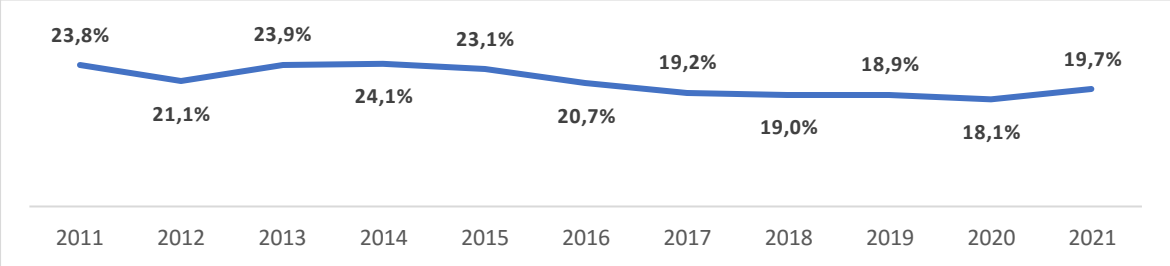
Table 7: Descriptive Statistics of Bank-Level Variables

	Mean	Median	Maximum	Minimum	Std. Deviation
ΔCredit	0.075	0.055	0.559	-0.111	0.108
ΔDeposits	0.063	0.036	0.570	-0.208	0.114
Bonds	0.209	0.203	0.366	0.016	0.073
Diversification	0.138	0.137	0.398	0.047	0.056
Size	21.619	21.511	24.041	19.704	0.911
Equity	0.070	0.071	0.208	0.022	0.031
GDP	0.020	0.022	0.034	-0.019	0.013
Inflation	0.023	0.029	0.048	-0.009	0.021

Within this context, it is informative to note that in Jordan, there is no secondary market for government securities. Whenever the government seeks local debt, it calls on the Jordanian Social Security Corporation and all licensed banks to subscribe to the issued securities and keep them until maturity.

Second, on average, the overall mean of bank holding of government securities divided by total assets reflects a marginal decrease (from 23.8 percent in 2011 to 19.7 percent in 2021).

Figure 3: Bonds to Total Assets



Third, as far as the determinants of bank-level credit to the private sector is concerned, the most interesting observation is the consistently negative and significant impact of bank holding of government securities (bonds) on the dependent variable (annual change in bank credit to the private sector).

Table 8: Determinants of the Change in Bank-Level Credit to Private Sector

	ROA	t-Statistic	NIM	t-Statistic
Variable	**Coefficient**		**Coefficient**	
C	0.223	2.839*	0.187	2.425*
ΔDeposits	0.668	4.913*	0.661	4.132*
Bonds	-0.115	-3.902*	-0.119	-4.824*
Diversification	-0.104	-2.254**	-0.099	-2.609**
Size	-0.007	-2.108**	-0.006	-1.700***
Equity	0.062	0.634	0.145	1.625
GDP	---	---	0.371	4.763*
Inflation	---	---	-0.544	-4.961*
Adj. R^2	0.854		0.863	
D-W Statistic	2.064		2.000	
*, **, and *** imply significance at the 99 percent, 95 percent, and 90 percent levels respectively.				

Fourth, as far as the other factors are concerned, and on average, their impacts on the annual change in bank credit to the private sector are expected. The annual change in bank deposits, real economic growth (GDP), and the inflation rate significantly impact the change in bank credit positively, positively, and negatively respectively. The remaining variables (diversification and size) are significant at the 95 percent level. Equity capital is the only insignificant variable in its impact on the change in bank credit to the private sector.

To sum up, the negative coefficient of bank holding of government securities (-0.115 without GDP and inflation and -0.119 including GDP and inflation), indicates that the micro analysis supports the finding of the macro analysis. In other words, at the macro and micro levels, local public debt crowds out the private sector from the credit market.

5. SUMMARY AND CONCLUSIONS

The state of public finance in Jordan has always been weak and poor. Indeed, and for decades, no government in Jordan has ever realized a surplus in its budget. This is an unfortunate observation for two several reasons.

First, as a result of the rising public debt during the 1980s, the Jordanian government defaulted on its foreign debt back in 1989, approached the IMF, and devalued the local currency (Dinar) by 50 percent in October 1989.

Second, recently, public debt has also been rising. Indeed, total public debt to GDP ratio has increased from 67.1 in 2010 to 106.2 percent in 2021. Indeed, if this recently realized increase in public debt maintains its upward trajectory, it might well reach unsustainable level, and the1989 experience might well be repeated.

Within the context of the unwarranted state of public finance in Jordan, this paper has examined the impact of local public debt on aggregate (macro) credit to the private sector and on bank-level (micro) credit to the private sector.

Based on the results, we can conclude that public debt in Jordan, while might have several other negative implications, negatively impacts bank credit to the private sector at both the macro and micro levels. This is why several recommendations can be highlighted.

First, the government should look at its public finances and ask why all past (and present) budgets suffer from deficits. Based on such an analysis, the government should take all the necessary steps to solve this issue. While several policy recommendations can be suggested, the establishment of an independent and non-partisan fiscal council whose objective is to promote sustainable public finances should be one of the recommendations.

Second, the government should look at the way it borrows from the local market. In other words, the government must adopt a long-term policy whose objective is to establish a local secondary market for its issued debt instruments. It does not make sense to always sell the issued securities to licensed bank and to the Jordan Social Security Corporation. As one might expect, such a policy recommendation might prove to be a challenging one. Indeed, any successful implementation rests on several conditions. For example, such a market must have macroeconomic stability. In addition, the government must be a credible issuer of securities, and prepared to pay market interest rates. Finally, such a market should be backed by an appropriate technical and regulatory framework.

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