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Crowding Out Effect of Public Borrowing: The Case of Jordan

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ABSTRACT

This study aims to investigate the effect of government borrowing (net claim no government) from Jordanian banks on credit facilities extended by licensed banks to private sector. A Vector error correction model is used to investigate the relationship between public borrowing and private credit. The paper concludes that government borrowing from the domestic banks leads to a more than one to one crowding out of private credit. This effect implies that government borrow from banks is not the only reason behind crowding out private credit. The increase in banks' treasury bills and bonds also reflects banks' preference to invest excess liquidity in a low risk high return investment. This is a case where the banking sector is colonized by "lazy banks."

Keywords: Credit Facilities to Private Sector, Net Claim No Government, Banking Sector, Crowding Out Effect
JEL Classifications: E5, G2

1. INTRODUCTION

Jordan's economy is considered a small-sized economy and financial system, with inadequate natural resources and therefore the government relied heavily on foreign aid and borrowing from the domestic and foreign market to meet the budget deficit. Also government's borrowing from the domestic market at a higher interest rate than that in the foreign market, and put additional burden on the budget, and reflected in the cost of private sector financing (cost effect) and the availability of financing of privet sector (crowding out).

Jordan economy since the mid-nineties, has implemented economic reforms, such as trade liberalization, privatization of many state-owned companies, and removes fuel subsidies In order to improve the discipline of fiscal consolidation. This entire step in the last two decade spurred economic growth by attracting foreign investment and creating some jobs. But because the global economic slowdown and adverse regional developments, in particular the Syria and Iraq crises, remain the largest recent shock affecting Jordan, the large number of Syrian refugees incoming the country is having a strong impact on the country's economy and social fabric. Other major challenges facing Jordan include high unemployment, a dependency on grants and remittances from Gulf economies as well as continued pressure on natural resources. In 2012, to correct budgetary and balance of payments imbalances, Jordan entered economic reform with International Monetary Fund (stand-by arrangement) Central Bank of Jordan, Annual Report (2013). And because Jordan's economy slowed down in 2015 for the first time since 2010, largely because of security spillover from the regional crises, Jordan entered another 3-year extended arrangement under the extended fund facility this program aims at advancing fiscal consolidation to lower public debt and broad structural reforms to enhance the conditions for more inclusive growth world bank, country overview (2016). As a result of the earlier conditions and despite of the reform programs Jordanian government it has expanded its lending from local sources to reach high ratio of debt to gross domestic product (GDP) (95% in 2016). Which lead to exist of crowding out effects of the government sector to the private sector?

This paper provided estimates of the magnitude of the crowding out effect of government borrowing on private credit in Jordan. And the rest of the paper is structured as follows. The second section provides a Literature summary, Section 3 discussion the trend in the Jordanian government borrowing, as well as the credit to private sector. Section 4 discussion the econometric issues in estimating the crowding out effect. Section 5 reports the results of empirical analysis.

2. LITERATURE OVERVIEW

Crowding out effect refers to the economic effects of expansionary fiscal actions, or cuts taxes crowding out private sector investment by way of higher interest rates. To the extent that there is controversy in modern macroeconomics on the subject, it is because of disagreements about how financial markets would react to more government borrowing Emran and Farazi (2009). Also the growing government borrowing from commercial bank lead a larger demand for money and loadable funds and therefore a higher interest rates, this increase will expected decrease the investment This is investment crowded out. Also a fall in investment can hurt economic growth then the relationship between government borrowing and credit to privet sector is negative. The popular discussion on crowding out is based on bank's balance sheet; if the government borrows one dollar more from the banks, the banks are left with one dollar less for the private sector. The banks, respond to a higher government borrowing by adjusting their loan portfolio optimally given the risk-return characteristics of different assets and liabilities.

The crowding-out effect can be moderate by the fact that government spending expands the market for company products through the multiplier and thus stimulates will lead to increasing fixed investment. This accelerator effect is most important when business suffers from unused industrial capacity, i.e., during a serious recession or depression.

Crowding out is most serious when an economy is already at potential output or full employment. Then the government's expansionary fiscal policy encourages increased prices, which lead to an increased demand for money. This in turn leads to higher interest rates and crowds out interest-sensitive spending. At potential output, businesses are in no need of markets, so that there is no room for an accelerator effect. More directly, if the economy stays at full employment GDP, any increase in government purchases shifts resources away the private sector. This phenomenon is sometimes called "real" crowding out Albatel (2003).

The negative effects on long-term economic growth that occur when private fixed investment are crowded out can be moderated if the government uses its deficit to finance productive investment in education, basic research, and the like. The situation is made worse, of course, if the government wastes borrowed money.

There a large number of empirical studies investigating the possible existence of crowding out and the degree of crowding out has appeared during the last two decades. Although these studies attempt to measure the degree of crowding out, they do not attempt to identify or verify the existence of the actual mechanism by which crowding out may be transmitted to the credit to privet sector. Bounader (2016) investigates the crowding out effect in Morocco through investing the relationship between the interest rate and the level of government spending. The results from the impulse response analysis of vector autoregression (VAR) model show the absence of such an effect. Spending in infrastructure, in communication and in welfare seem to build the basis of modern economy that will attract private investments, and the result will not be materialized in the immediate short term. Fayed (2013) study the effect of government borrowing on private credit "quantity channel" of crowding out of private investment in Egypt. It concludes that government borrowing from the domestic banks crowds in private credit due to the strong risk diversification effect because of safe government assets in banks portfolios. Where Khan and Gill (2009) investigating the possible existence of crowding out function by using public borrowing, GDP and lending rate has been estimated through vector error correction model (VECM). The results provide the evidence of crowding-in effect, which explains the direction of public expenditures towards private sector through contractors, politicians and bureaucrats, instead of public projects. The provision of subsidy, transfer payments, and substantial amount of micro-credit also explain the phenomenon of crowding-in. The evidence has important implications for fiscal management.

Emran and Farazi (2009) examined the relationship between Government Borrowing and Private Credit in Developing Countries, and give robust estimates of the causal impact of government borrowing on private credit using panel data on 60 developing countries and instruments based on the structure of the political system. The point estimates indicate that a $1.00 more borrowing by government decreases private credit by about $1.40. Also estimated bounds on the crowding out effect under the assumption that the instruments are "plausibly exogeneous." The evidence is consistent with a "lazy bank" model of bank behavior in developing countries. similarly Abdel-Kader (2006) examine the extent of credit decline to the private sector in Egypt and whether it is due to supply factors, demand factors, or other factors (crowding out). The study finds that noninterest lending criteria have been tightened and that interest rates are no longer the decisive factor in lending decisions. In addition, due to the problem of non-performing loans, banks are becoming more risk-averse as reflected by the reduction in credit and investment in more liquid and less risky assets such as treasury bills and government bonds. Where Albatel (2003) investigate the impact of the government budget deficits on private sector activities especially investment in Saudi Arabia, the results show that government budget deficits have a crowding out effects on private sector investment. Thus, it is possible that financing government budget deficits by borrowing from domestic markets reduces financial resources available to the private sector and discourages private sector investment.

Atukeren (2004) analysis the relationships between public and private investments in developing countries. By investigate whether public investment "crowds out" or "crowds in" private investment by using cointegration analysis and granger-causality tests. The analysis identifies 11 countries where public investment crowds out private investment and eight cases where there is a crowding in effect from public investments to private investments. In six countries, no statistically significant crowding out or crowding in effects are present. In a second step of analysis, run a probit regression where the dependent variable takes the value "1" if the private investment has been found to be crowded out by public investment for a given country.

3. PRIVATE CREDIT VERSUS GOVERNMENT BORROWING DEVELOPMENTS IN JORDAN

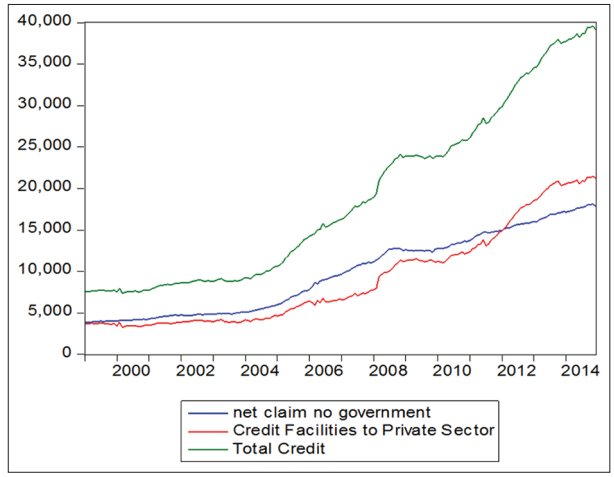
Jordanian government faces significant constraints on raising revenue as the set of policy instruments available is limited given the structure of the economy and low level of income (Fielding (2007); Sah and Stiglitz (1992)). Facing such constraints, the government has strong incentives to finance its expenditure through domestic and international borrowing. However, the access to international credit market may sometimes be limited. Thus, the government, in recent years, resorted to borrowing more from the domestic sources. Figure 1 plots the time series of the net claims on government compared to the credit extended to the private sector both.

This simple time series plot seems to indicate that there is a positive correlation between government borrowing and private credit, that is they move together over time. This gives an impression of crowding in effect rather than crowding out. This relationship needs to be further investigated using an adequate econometric model. However, starting 2004, credit extended to the private sector slowed down crowded out by the relatively higher growth rate of credit extended to the government.

A point worth noting here is that the growth rate of banks' lending capacity has continuously surpassed that of total loans acquired by all sectors including the government and private sector. This is clearly depicted in Figure 2.

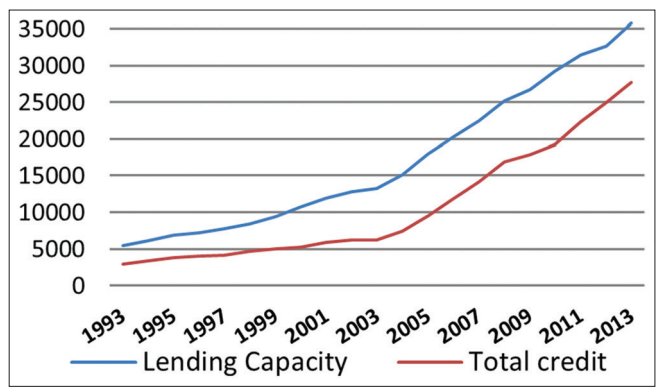
The latter fact implies that government borrowing from banks is not the sole reason behind crowding out private credit. Bank credit demand stemming from the private sector could be slowing down challenged by cumbersome bureaucracy and scarcity of skilled labor. Also, the banks themselves could be cautious with regards to extending further loans to the private sector within the context of a drive to maintain their balance sheets as liquid as possible. So, the growth in banks' lending capacity and the increase in their holdings of securities and treasury bills may partly be attributed to banks' preference to engage in less risky sovereign lending.

Figure 1: Credit indicators



Source: Central Bank of Jordan

Figure 2: Total credit and lending capacity



Source: Central Bank of Jordan

4. DATA AND METHODOLOGY

In this study, monthly time series would be used from 2000 to 2015 for all variables (all variable adjusted for seasonal adjustment using X-12 approach). The included variables in this study were the:

- Credit facilities extended by licensed banks to private sector (CPRI): Defined as the claims on the private sector by deposit money banks and other financial institutions.
- Net claim no government (CGOV): Defined as the claims on central government by the deposit money banks and other financial institutions.
- Industrial production index (IPI): The use of industrial production as a proxy for GDP is due to data availability constraints. According to Djankov et al. (2007). The set of control variables includes, IPI captures the idea that only a large enough economy is able to incur the fixed costs involved in setting up credit market institutions. When the banking sector is more developed in a country, the household savings intermediated through the financial sector is also higher. The aggregate credit availability in an economy will thus be higher when the breadth and depth of the financial intermediation is higher.
- Weighted average interest rate on lone and advance facility (R): One might worry that by using the available bank deposits as a control, we may be over-estimating the crowding out effects of government borrowing as it does not allow for any possible countervailing effect through a higher interest rate (and thus higher savings and deposits) resulting from government borrowing.
- The level of financial intermediation (FIN): Using the reference rate approach, the spread between the reference rate and the rate on deposits should reflect the implicit price paid to depositors, while the spread between the reference rate and the rate received on loans from borrowers should, accordingly, reflect the implicit service charge. The reference rate method requires data on the average end-period stock of loans and deposits for different sectors of the economy, as well as the interest rates applicable, and can be estimated using a simple equation. FISIM estimated by this approach is valued at current prices.

$$FISIM=(r_L-r_L)Y_L+(r_r-r_D)Y_D$$

Where: rr = reference rate, r_L = interest rate on loans y, Y_L = average balance on loans, r_D = interest rate on deposits y, Y_D = average balance on deposits.

This might manifest itself as a spurious positive relationship between government borrowing and private credit (i.e. crowding in), both driven by the higher aggregate credit supply resulting from increasing financial deepening.

- The institutional quality (I): We control for institutional quality in the regressions as the efficacy of the contract enforcement institutions, and, in general, rule of law can be an important determinant of private credit. The regulatory quality indicator is used as an indicator of institutional quality in an economy. This indicator is reported by the World Bank in its Worldwide Governance Indicators. It reflects the perception of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

The basic model specifying the private credit from the banking sector is expressed as follows:

$$Cpri_t = \alpha_0 + \beta_1 Cgov_t + \beta_2 IPI_t + \beta_t Fin_3 + \beta_4 I_t + \beta_5 R_t + \varepsilon_t$$

This equation basis motivated by Djankov et al. (2007). The β_1 crowding out of private credit by government borrowing implies that $\beta_1 < 0$. If the risk diversification effect dominates then we expect that the absolute value of β_1 lees than 1 when β_1 lees than 0; and in extreme case it can be positive, i.e. β_1 more than 0. If the banks behavior is better characterized by the "lazy bank" view, then one expects that $|\beta 1|$ more than 1 with $\beta 1 < 0$. In exceptional case, it is possible that the risk diversification effect approximately cancels out the lazy bank effect in the aggregate and we have β_1 Almost equal −1 (Emran and Farazi 2009).

As previously mentioned, this study aims at testing the long and short run causality relationship private credit and government borrowing in Jordan. And to examine the relationship between the variables of the study and to give, as much as possible, accuracy in the prediction of the relationship, the existence of stationary and cointegration in and between time series would be tested. This test allows us implementing the (VECM) model which assumes all variables to be endogenous.

Unit root test (stationary test): Since variables are mostly non-stationary and because the OLS approach gives spurious results which requires testing that the variables are stationary or not, which measured through testing the stability of mean and variance through a period of time (no trend exists) Al-Zoubi et al. (2013). In addition, the value of covariance between any two closed values depends only on the lag period. In this field, both of Dickey and Fuller improved a test for the above mentioned conditions. If the expected (calculated) value, in absolute term, is less than the table value (or the P-value more than 5%), this means that data are non-stationary.

Cointegration test: If the data are stationary at the same level I (1), then it would be possible to the linear combination of the variables to be stationary at the zero level I (0) which means that the data are cointegrated. It is also possible to have more than one linear combination, and so more than cointegration relationship between the variables exists. The results obtained from this test are used in applying the VECM which measures the long – run relationship.

VECM: The VECM can lead to a better understanding of the nature of any non stationarity among the different component series and used to identify equilibrium or a long-run relationship among the variables Al-Majali and Al-Assaf (2014), can also improve longer term forecasting. The VECM (p) form with the cointegration rank ($r \leq k$) is written as:

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \sum_{i=1}^{p-1} \varnothing_i \Delta Y_{t-1} + \partial \in_t + \varepsilon_t$$

Where is the differencing, $\varnothing$ a is a short term parameters matrix, γ long run parameters, ∂ speed of adjustment, Y the variable matrices (CPRI), (CGOV), IPI, weighted average on lone and advance facility (R), FIN, and the institutional quality (I).

5. ESTIMATION RESULTS

5.1. Descriptive Analysis

Table 1 summary statistics descript of the natural logarithm of (CPRI), (CGOV), IPI, weighted average on lone and advance facility (R),(all variable adjusted for seasonal adjustment using X-12 approach). Also Figure 3 shows the path of the variables used in the study

5.2. Unit Root Test

As a prerequisite for the cointegration test, stationary properties of the variables in the basic model have been verified by performing Augmented Dickey-Fuller (ADF) test Dickey and Fuller (1981). Results of ADF test as shown in Table 2 all the variables were non-stationary in levels and stationary at first difference (integrated of order one, i.e. I (1)) which is the common phenomenon in most of the economic time series.

5.3. Cointegration Analysis

The results of stationarity analysis shown in the Table 2 showed that all the variables are non-stationary at levels were integrated of same order 1. Thus, we can proceed with carrying out Johansen maximum likelihood cointegration test to investigate the presence of a long-run relationship among the variables Johansen and Juselius (1990). We start by running the unrestricted VAR in levels in order to specify the appropriate lag length Al-Adayleh (2015). Using Schwartz criterion, the lag length was found to be 3. Statistical results of the Johansen test for cointegration are summarized in Table 3. The results for both trace statistic and maximal Eigen statistic were reported in Table 3

Table 1: Descriptive analysis

Statistical measures	CPRI	CGOV	IPI	FIN	I	r
Mean	8.9	9.1	4.9	6.4	4.1	2.2
Median	8.8	9.2	5.0	6.3	4.1	2.2
Maximum	10.0	9.8	5.1	7.5	4.2	2.6
Minimum	8.1	8.3	4.5	4.8	4.0	2.0
SD	0.6	0.5	0.2	0.7	0.0	0.1
Skewness	0.3	−0.1	−0.9	−0.3	0.1	0.8
Kurtosis	1.6	1.4	2.6	2.2	2.2	3.1
Jarque-Bera	18.2	21.0	28.2	9.1	5.8	21.9
Probability	0.0	0.0	0.0	0.0	0.1	0.0

SD: Standard deviation, CGOV: Net claim no government, CPRI: Credit facilities extended by licensed banks to private sector, IPI: Industrial production index, FIN: The level of financial intermediation

Figure 3: Plot of the sample series

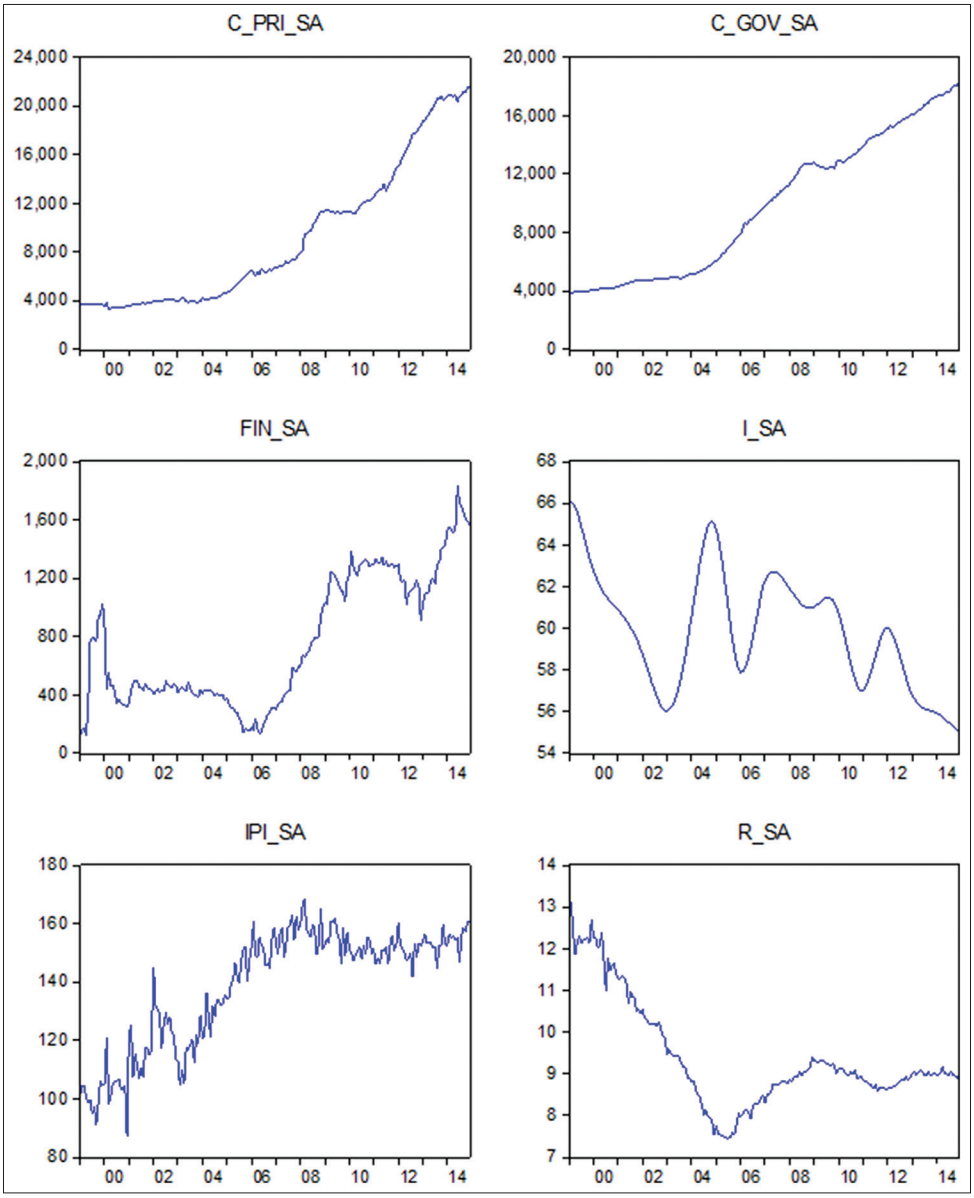


Table 2: ADF unit root test

ADF results				
Variable	With intercept		With time	
	Level	First difference	Level	First difference
CPRI	1.03	−17.79*	−2.87	−18.09*
CGOV	−0.88	−3.00**	−1.47	−5.79*
IPI	−1.83	−8.48*	−1.99	−8.55*
FIN	−1.33	−7.58*	−2.31	−7.55*
I	−1.09	−6.63*	−1.52	−6.61*
r	−2.12	−4.20*	−1.34	−4.47*

*, **Refer to that the null hypotheses that the sires contains a unit root is rejected at 1%, and 5%, significance level, respectively (the critical values (with time) are: 1%, −4.1; 5%, −3.5; and the asymptotic critical values (with intercept) are: 1%, −3.6; 5%, −2.9. Since the distribution of the ADF statistic is non-standard and requires the use of critical values tabulated by MacKinnon (1996)). CGOV: Net claim no government, CPRI: Credit facilities extended by licensed banks to private sector, IPI: Industrial production index, FIN: The level of financial intermediation, ADF: Augmented Dickey-Fuller

indicates that there is four co-integrating equation at 5% significance level. This implies the existence of some equilibrium relation.

5.4. Lag Order Selection Criteria

The first step in multivariate cointegration analysis is the appropriate lag selection for the variables. For selection of appropriate lag length, the study used two criteria Akaike Information Criteria (AIC) and Schwarz Bayesian Criteria (SBC) Al-Majali and Alrfua (2017). As shown in Table 4 the criteria AIC shows the optimal lag is 4 and SBC selected lag length of 3. In this study used the optimal lag 3.

5.5. Long-run Relationship

After normalization the first cointegrating vector on CPRI normalized cointegrating coefficients were estimated as reported in Table 5. The estimated long-run relationship is given as follows the numbers in parenthesis are the t-statistics. At 5% significance level, all coefficients are statistically significant, except IPI.

The first normalized equation was estimated as below:

CPRI = 36.42−1.51*CGOV+1.11*IPI+1.69*FIN–5.71*I–3.02*R

Table 3: Results of Johannes's cointegration

Hypothesized No. of CE (s) 2	Trace statistic 3	5% critical value	1% critical value
R=0	175.5*	95.8	0.000
R=1	108.6*	69.8	0.000
R=2	66.4*	47.9	0.000
R=3	36.5*	29.8	0.007
Hypothesized No. of CE (s)	**Max-Eigen statistic4**	**5% critical value**	**1% critical value**
R=0	66.8**	40.1	0.000
R=1	42.2**	33.9	0.004
R=2	29.9**	27.6	0.025
R=3	21.3**	21.1	0.048

*Trace test indicates cointegration at both 5% and 1% levels of significance **max-eigenvalue test indicates cointegration at both 5% and 1% levels of significance. The 5% and 1% critical values in the two columns are taken from Osterwald-Lenum (1992)

Table 4: VAR lag order selection criteria on the length of lags

Lag	AIC	SC
0	−8.21	−8.10
1	−29.51	−28.77
2	−33.24	−31.88
3	−33.96	−31.97*
4	−34.02*	−31.40
5	−33.96	−30.71
6	−33.94	−30.06

*Indicates lag order selected by the. VAR: Vector autoregression, AIC: Akaike Information Criteria

Table 5: Normalized cointegrating coefficients

CPRI	CGOV	IPI	FIN	I	R	Constant
1	1.51	−1.11	−1.69	5.71	3.02	−36.42
S.E	−0.37	−1.09	−0.17	−1.66	−0.86	
t-value	4.14	−1.01	−9.74	3.45	3.51	

CGOV: Net claim no government, CPRI: Credit facilities extended by licensed banks to private sector, IPI: Industrial production index, FIN: The level of financial intermediation

Table 6: Vector error correction estimates

Error correction	D (CPRI)	D (CGOV)	D (FIN)	D (I)	D (IPI)	D (R)
EC	−7.4E-05	0.001	0.151	−5.9E-05	−0.005	0.010*
D (CPRI (−1))	−0.254**	0.005	0.403	0.0006	−0.127	0.019
D (CPRI (−2))	0.066	0.065**	0.158	0.0007	0.015	0.001
D (CPRI (−3))	0.045	0.016	0.570***	0.001	0.061	0.101**
D (CGOV(−1))	0.656**	0.049	−2.014**	−0.002	−0.446	−0.007
D (CGOV(−2))	0.189	0.235**	−3.144**	0.004	0.442	−0.010
D (CGOV(−3))	0.01	0.250*	−2.264**	−0.001	0.296	−0.219**
D (FIN (−1))	0.012	−0.011**	0.1450**	5.26E−05	−0.010	0.016**
D (FIN (−−2))	−0.008	0.008	0.1520**	−0.0003	−0.022	0.010
D (FIN (−3))	0.002	−0.010**	0.1192***	0.0003	−0.018	−0.002
D (I (−1))	0.509	−0.038	2.131	1.393*	9.937***	1.2585
D (I (−2))	−5.188	0.107	8.895	0.027	−22.340**	−1.782
(I (−3))	4.594	−0.062	−11.753	−0.4741*	13.325**	0.006
D (IPI (−1))	−0.016	0.009	0.2621	−0.001	−0.514*	0.001
D (IPI (−2))	−0.046	0.009	0.182	−0.001	−0.339*	0.022
D (IPI (−3))	−0.016	−0.011	−0.011	−0.0003	v0.063	0.030
D (R (−1))	−0.067	−0.040	−2.241	0.001	−0.129	−0.423*
D (R (−2))	0.234	−0.050	−4.424*	0.002	0.531**	−0.214**
D (R (−3))	−0.057	0.046	−1.731**	0.001	0.151	−0.009
C	0.003	0.002**	0.041**	−6.5E−05	0.005	−0.002***

*The coefficient significantly different from zero at 0.01% probability level. **The coefficient significantly different from zero at 0.05% probability level. ***The coefficient significantly different from zero at 0.10% probability level. CGOV: Net claim no government, CPRI: Credit facilities extended by licensed banks to private sector, IPI: Industrial production index, FIN: The level of financial intermediation

According to the first normalized equation, CPRI showed significantly negative relation with CGOV in long-run which suggested. This result proof of the crowding out effect of government borrowing on private credit The absolute value of the coefficient of government borrowing is more than one (−1.51). This reported coefficient is consistent with the lazy banks model. The

estimate implies that a 1 JD increase in government borrowing from the domestic banking sector reduces private credit approximately by 1.51 JD. As for the rest of the explanatory variables, the positive impact of FIN on the private credit is expected. However, the negative impact of lending interest rates on private credit consistent with theory, because increases the cost of borrowing discourages people from borrowing. Also, the positive impact of industrial production (IPI) reflects the fact an increase in IPI usually leads to greater flows of household income and a rise the credit.

5.6. Short-run Analysis

Once the long-run relationship is established, we need to discuss the short-run dynamics of the basic model through an error correction model (ECM) Alamro (2017). Using the lag length specified in the unrestricted VAR, previously mentioned to be 4, the estimated results of the ECM are presented as follows:

EC represents the error correction term. The coefficient of the error correction term is statistically negatively significant, at 5% significance level. Thus, there is a tendency in the model to return to its long-run equilibrium path whenever it drifts away. That is, nearly 0.75% of the disequilibrium between private credit and the explanatory variables is compensated in the following period.

After conducting long-run and error correction analyses we proceed for analyzing the short-run status of the models. So, Table 6 presents the results of the short-run analysis.

6. CONCLUSIONS

The study is conducted with a view to examine the presence of crowding-out effect of public borrowing on credit to private sector in Jordan. A long-run relationship has been estimated and analyzed by performing unit-root test, cointegration test and error correction model (VECM). The main findings of the study confirmed with statistical significance that there is empirical evidence negative impact of government borrowing on private credit and the crowding out is more than one to one. These outcomes go along with the lazy bank model of the endogenous reaction of banking sector to government borrowing.

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