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Does Government Borrowing Crowd Out Private Sector Credit in Bangladesh?

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Abstract: This paper explores the link between Government borrowing from domestic sources, and private sector credit in Bangladesh. Government borrowing facilitates financing the deficit budget, distortionary debt and to meet demand for development expenditure without increasing taxes. It investigates whether the government borrows crowds out or crowds in private sector investment. The ARDL bounds testing model is used to estimate short-run and long-run effects. This study finds that increasing government borrowing crowds out private sector credit, and suggests for an efficient administration of financial strategy, which has a central role in regulating domestic government borrowing.

Key Word: Government Borrowing, Private Sector Investment, Crowds out, ARDL bound testing.

1. Introduction

Commercial banks and other financial institutions are the most crucial supplier of private sector credit in developing countries for private investment. The Government and private sector borrow money from the commercial banks and other financial institutions in Bangladesh. Government borrowing affects an economy in two ways. One side, it decreases credit for private sector borrowing and on the other side it influences productivity and economic growth. The blanching distribution of credit by financial institutions to the government and private sector is important for achieving sustainable development in Bangladesh (Salim & Mamun, 2018). Most important implication of government borrowing from domestic sources is crowding out of private sector investment. It is proved from empirical analysis and investigations that government debt from the private sector is influencing 'crowds out' of private investment. Aschauer (1989) argues that higher public capital accumulation increases the public investment rate but decreases private sector borrowing which is called crowding out effect.

The responsiveness of private sector investment describes the patterns and nature of government borrowing collection. It is an opportunity to investigate how the structural dynamic influenced by government borrowing affects private investment. Traum & Yang (2011) identified two primary reasons for increasing government borrowing: Government development expenditure and distortionary debt financing. One of the most common forms of crowding out takes place when the government increases its borrowing and that reduces private sector investment. This investigation attempts to understand the potential unbalanced impacts of private sector credit and government borrowing.

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2. Literature Review

2.1 Theoretical Literature

According to (Barro, 1974), "the assumption that government debt is perceived as net wealth by the private sector is crucial in demonstrating the real effects of shifts in public debt stock." It describes the connection between the economy's capacity and government debt. Government borrowing plays a role in this optimum wealth holding. It can be explained under three diverse theoretical approaches.

Initially, the Keynesian economist shows that fiscal expansion favors private investment and production. An increase in government borrowing can lead to higher interest rates because it increases the demand for credit and reduces the availability of private investment. Likewise, the Keynesian perspective shows that increasing government expenditure can expand output more remarkably than the underlying spending increase in the recession situation (Barro, 1990; and Perotti, 1999). Contemplating all the above, Keynesian methodology upholds that if the optimal amount of resources is not available to achieve economic growth, government borrowing might crowd in private investment through increasing aggregate demand.

Second, the neoclassical economists' thought is government domestic borrowing increase interest rates, which causes decrease in private sector credit that leads to crowding out effect. Mankiw (1987) argues that permanent increase in government expenditure decreases real interest rates which causes a net crowd effect, but temporarily crowd in investment at the expense of consumption. Friedman (1978) also argues that both crowding out and crowding in can occur: a short-term borrowing causes crowding in and long-term borrowing causes crowding out. New classical theories predict that an increase in government borrowing may cause crowding in or crowding out of private investment.

Third, the Ricardian theoretical view says that financing government spending out of current taxes or future taxes (and current deficits) will have equivalent effects on the overall economy. An economy when increasing debt-financed, government spending will not be effective because investors and consumers understand that the debt will eventually have to be paid for in the form of future taxes. The theory argues that people will save based on their expectation of increased future taxes to be levied to pay off the debt, and that this will offset the increase in aggregate demand from the increased government spending.

Different Economist have been discussed the crowding out effect in different forms since long time. People of the countries which have lower volumes of international trade compared to the present day thought that capital is finite and confined to individual countries for most of the time. So, the Government's increased borrowing to manage expenditure for development projects and public spending will reduce the private sector investment for less availability of money. Therefore, Government borrowing may influence crowding out private sector investment especially for non-industrial country.

2.2 Empirical literature

The effect of government borrowing on private sector investment is studied by different researchers at different times. Doi, Hoshi, & Okimoto, (2011) and Bouthevillain & Dufrénot, (2011) found that a significant and positive effect of government borrowing on the real Gross Domestic Product during crises for short and long run using the time-varying likelihood Markov-switching model.

Ko & Morita (2018) using a Markov-switching vector-autoregressive (VAR) model showed a strong positive relationship between public expenditure and aggregate GDP during the crisis when the tax multiplier is less than the expenditure multiplier (Similar to Keynesian Theory).

Chibi, Chekouri, & Benbouziane (2019) investigated a non-linear effect using a Markov Switching VAR model to explore the impact of fiscal policy on economic activities in Algeria and found that there is an asymmetric effect of fiscal policy across regimes in the business cycle of boom and recession.

Mukambi et al., (2016) found that fiscal policy regimes are significant in explaining the relationship between government debt-private sector credit using ARDL bound testing Model for Kenya. There was evidence that persistent increases in government debt crowd out private sector credit. On the other hand, Majumder (2007) found that there is no crowding out effect in Bangladesh based on the error correction models. Zaheer et al., (2019) found that Government borrowing leads to crowding out of private sector credit due to reduced availability of the loan-able funds. The findings of study (Demirel et al., 2017) support the existence of the crowding out effect for Government borrowing in the Eurozone for the period of 2000–2015. Shah & Pervin, (2012) and Banerjee et al., (2019) found that government borrowing crowds out private sector investment which is negative effect on economic growth of Bangladesh using error correction model.

According to the Keynesian framework, an increase in public investment can be helpful to private investment if the government invests in infrastructure, capacity enhancing projects and human resources development that creates crowding-in effect. Aschauer (1989), Ramirez (1994), Argimon et al., (1997), Martinez-Lopez (2006), Ang (2007), and Hatano (2010), observe the existence of crowding-in effect.

Contemporary from above, there are three conflicting views about government borrowing: crowd out, the crowd in, and the neutral effect on private investment, which explain the contractionary and expansionary fiscal policy. This paper aims to find out whether Government borrowing crowds out private sector credit in Bangladesh.

3. Methodology

3.1 Data and Model Specification

This research evaluates the relationship between government debt, economic growth, and private credit. The theoretical model suggests links between private sector credit and fiscal policy. The empirical study employs time series yearly data for Bangladesh over the period 1990 – 2019. The observations of the variables obtained from the world development indicator.

The investigation involved two significant steps, First, having fiscal policy effect in the short-run and long-run using ARDL bound test. Second, fully modified ordinary least squares (FMOLS) are used to check and confirm the long-run relationship and responsiveness of government borrowing, economic growth, and private credit.

This study considers dynamic regression analysis for the estimation of possible endogeneity and exogeneity problems. Examine the long-run relationship between private sector credit and different policies. The ARDL bounds testing approach developed by Pesaran et al., (2001a). The Bounds under ARDL testing approach is applied to test for the long-run relationship. Also, this test is performed for checking the level of integration of order I(1) or I(0) and the level of cointegration. The unit root test identified mixed

stationery of variables (see table 1). The ARDL model is identified as the combination of lagged values of the considered variables and the corresponding differenced variables as follows:

$$\Delta PCredit_t = \gamma_0 + \gamma_1 t + \sum_{i=1}^{m} \gamma_{2i} \Delta PCredit_{t-i} + \sum_{i=0}^{p} \gamma_{3i} \Delta TDC_{t-i} + \sum_{i=0}^{q} \gamma_{i4} \Delta LnGDP_{t-i} + \sum_{i=0}^{r} \gamma_{5i} \Delta m3.GDP_{t-i} + \sum_{i=0}^{s} \gamma_{6i} \Delta LR_{t-i} + \gamma_7 PCredit_{t-1} + \gamma_8 TDC_{t-1} + \gamma_9 LnGDP_{t-1} + \gamma_{10} M3/GDP_{t-1} + \gamma_{11} LR_{t-1} + u_t$$

3.2 Estimation Procedure

Investigating the static properties of all the variables is important for empirical analysis. By checking all the variables' stationary properties, investigate the cointegration between variables by applying the Bounds Test approach. For the empirical analysis, the unit root test is applicable by including the Augmented Dicky-Fuller (ADF) Unit Root Test and Phillips-Perron (PP) Unit Root Test (see table 1). This test was developed by Pesaran, Shin, & Smith (2001), which is more effective than other cointegration approaches and tests (S. Narayan & Narayan, 2004) due to the small sample size in the economy.

An ARDL model is applied to identify the variables' short-run and long-run elasticity relationships. The ARDL model prefers for its advantage compared to other conventional models. It helps to provide the simultaneous analysis of both the short-run and the long-run impact between variables. This approach helps identify the effects of independent variables on the dependent variable. ARDL is the best approach to provide superior results for any small sample analysis in the economy. The ARDL model can eliminate the endogeneity problems while assuming all the variables as endogenous by using the Engle-Granger method (Al-Mulali, Saboori, & Ozturk, 2015). Engle & Granger (1987) argues that in the long run, if the cointegration exists between the variables, it signs for unidirectional or bi-directional Granger-causality between these variables, while a finite sample does not uncover it. Finally, the Granger causality testing according to the VECM will be applied to investigate the causal relationship between the output gap and its determinants variables.

Table 1. Unit Root test

Variable	Augmented Dicky-Fuller Unit Root Test				Phillips-Perron Unit Root Test			
	Level		First Differences		Level		First Differences	
	Intercept	Intercept and trend	Intercept	Intercept and trend	Intercept	Intercept and trend	Intercept	Intercept and trend
LGDP	-2.270	-5.404*	-9.002*	-8.767*	-2.269	-5.778*	-14.051*	-13.678*
PCREDT	0.289	-2.843	-5.326*	-5.263*	0.473	-2.831	-5.330*	-5.262*
TDC	-1.339	-1.296	-5.063*	-5.279*	-1.446	-1.413	-5.062*	-5.567*
M3/GDP	-0.747	-2.268	-3.499**	-3.422**	-0.569	-1.509	-3.483**	-3.403***
LR	-1.767	-3.461*	-3.911*	-3.827*	-1.267	-1.618	-3.911*	-3.827**

3.3 Bounds Test Approach

The Unrestricted Error Correction model (UECM) is formulated for the bounds test approach. For the study, the UECM specification is shown in Eq. (5).

$$\Delta PCredit_t = \gamma_0 + \gamma_1 t + \sum_{i=1}^{m} \gamma_{2i} \Delta PCredit_{t-i} + \sum_{i=0}^{p} \gamma_{3i} \Delta TDC_{t-i} + \sum_{i=0}^{q} \gamma_{i4} \Delta LnGDP_{t-i} + \sum_{i=0}^{r} \gamma_{5i} \Delta m3.GDP_{t-i} + \sum_{i=0}^{s} \gamma_{6i} \Delta LR_{t-i} + \gamma_7 PCredit_{t-1} + \gamma_8 TDC_{t-1} + \gamma_9 LnGDP_{t-1} + \gamma_{10} M3/GDP_{t-1} + \gamma_{11} LR_{t-1} + u_t$$

In the UECM model in Eq. (5), "m" represents the number of lags and "t" represents trend variables. A Wald Test or F-statistics process follows the cointegration relationship in a generalized Dickey-Fuller type regression. This test is applied to determine the significance of lagged levels of the variables throughout the conditional UECM (P. K. Narayan & Narayan, 2004).

For the study, the F test null hypothesis establishes as $H_0 = \gamma_7 = \gamma_8 = \gamma_9 = \gamma_{10} = \gamma_{11} = 0$, where the calculated value of F statistics compares with table 2 bottom and upper critical values(Pesaran et al., 2001b). For the cointegration relationship, the decision can be made without knowledge of the integration order of the regressors if the computed F-statistic falls outside the upper and lower bounds. For example, the null hypothesis of no cointegration rejects if the computed F statistics is greater than the upper bound. In the same way, the null hypothesis of no cointegration accepts if the calculated *F* statistics are lower than the bottom bound (P. K. Narayan & Narayan, 2004). If the calculated F statistics are between the bottom and upper critical values, there is no proper decision. For the UECM model, the maximum level of lag number takes 1, and the lag number is found at one by applying the Akaike criteria. The comparison makes for the computed *F*-statistic from the UECM model with table bottom and upper critical levels (Pesaran et al., 2001b). The results of the bound test shows in Table 2 below:

Table 2. Result of Bounds test

Model	Lag	F-stat	Critical Values	I(0)	I(1)	Diagnostic Test	
PCredit | LGDP, LR, M3/GDP, TDC	(2,0,1,2,3)	5.1542**	1%	4.4	5.72	F_{Auto}	0.21
			5%	3.47	4.57	χ^2_{Hetero}	0.57
			10%	3.03	4.06	$\chi^2_{Normality}$	0.95

**represent <5% level.

Note: k is a number of independent variable numbers in Eq. (1). Critical values take from Table C1.v at (Pesaran et al., 2001b).

In table 2, the F statistic is greater than the upper bound values, and we reject no cointegration null hypothesis. Therefore, the bound test approach has a significant cointegration relationship between credit and the other variables.

3.4 ARDL Model

Applying the ARDL model, the long and short-run relationships between the variables analyze after the causality analysis. ARDL model specification is introduced for the study in Eq. (6).

$$\Delta PCredit_t = \gamma_0 + \gamma_1 t + \sum_{i=1}^{m} \gamma_{2i} \Delta PCredit_{t-i} + \sum_{i=0}^{p} \gamma_{3i} \Delta TDC_{t-i} + \sum_{i=0}^{q} \gamma_{i4} \Delta LnGDP_{t-i} + \sum_{i=0}^{r} \gamma_{5i} \Delta m3.GDP_{t-i} + \sum_{i=0}^{s} \gamma_{6i} \Delta LR_{t-i}$$

For determining the optimal lag length in Eq. (6), one is taken for the maximum lag number, and ARDL (2,0,1,2,3) model is selected by applying the Akaike information criterion (see figure 1).

4. Empirical Results

The unit root test results are in Table 1 to determine the integration order of the series. The results in Table 1 over wheedlingly confirm that the series used in this paper are integrated order I(1), or I(0), but not of order two, I(2). Since the order of the series is not I(2), I can apply the ARDL bounds testing approach to test cointegration among the variables, pcredt, lgdpg, pdcredt, lr, m3/gdp, tdcgdp.

The Pesaran's ARDL bound tests results presented in table 2. I use both the critical values for determining the long-run forcing variable found in (Pesaran et al., 2010), and modified by (P. K. Narayan, 2005) for small samples. The deterministic term included in the model is an available intercept. Using the critical value, I reject the null hypothesis of no cointegration at a 1% significance level. I statistically confirm a long-run economic relationship among lgdpg, lr, m3/gdp, tdcgdp. Table 4 reports the estimated long-run ARDL cointegration model (2,0,1,2,3), selected automatically by applying the Akaike Information Criterion (AIC) out of 768 models. The AIC criterion automatically determined the lag be 3. The restricted trend tern included in the model was not significant. I further specified an available constant as the deterministic term.

The estimated constant term in Tables 4 and 5 is negative and highly significant at the 1% significance level. In addition, equivalent models, namely the Fully Modified ordinary least square model, has been utilized to evaluate the cointegrating regression model and estimate the long-run model (Under the ARDL model) to determine the consistency of the results as The ARDL model is appropriate and suitable for controlling serial correlation and endogeneity in single equation model (Pesaran et al., 2001b) (Greene, 2005). In Table 5, the estimated results show that the coefficients of GDP, LR, m3/GDP, and tdcgdp are highly significant. The diagnostic test shows that the model was no problem with normality and Heteroscedasticity. Moreover, there is no present serial correlation problem. Also, the coefficient of the cointegrating equation is significant and negative. The coefficient of the error correction term -91.72 indicates that difference from the long run credit flow is adjusted by 91.72 percent for the long run. Total domestic credit has negative effect on the long run credit growth path significance in the long run ARDL model but also this result confirms under FMOLS model. Lending rate, GDP, and Broad money supply results conform to theory. Broad money (% of GDP), GDP growth rate, and Lending Interest Rate have a significant and positive effect on private sector credit. The contrast between ARDL and FMOLS result indicates that the significance and signage is relatively constancy for the model (table 5). Though, the coefficient of government debt is negative with significance under FMOLS. The long run findings suggest that the government borrowing crowding out in private sector credit.

The short-run model shows that the intercept term and LR coefficients are positive and significantly affect PCREDT. Broad money supply as a percentage of GDP (M3/GDP), the coefficient of M3/GDP is significant, but ΔM3_GDP is positive but not significant. In

addition, ΔM3_GDP (-1) is significant negative on PCREDT. The coefficients of TDCGDP are significant and have a significant positive effect on PCREDT.

5. Discussion and Conclusion

The short-run model shows that lending rates have a negative and significant impact on private sector credit. Private investment reacts to a rise in the debt cost by decreasing the quantity of credit lent from the commercial banking source. The relationship between the lending rate and private sector credit is negative, so the implication is that expansions of the income decreased demand for credit because of expansion in individual sources of investment. This reason is valid for Bangladesh.

The relationship between domestic debt and private sector credit is positive in the short run. However, the FMOLS model shows that the relationship between domestic debt and private sector credit is significant and negative. Hence, the outcomes recommend that expansion in government debt influences private sector credit in the long run. FMOLS and bound test approach confirmed that there is a crowding out of private sector credit over the long run. The empirical result suggests that fiscal policy influences the allotment of private sector credit. The outcomes reveal that the persistence effect of government borrowing crowds out private sector credit.

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Appendix

Fig. 1. Model Selection

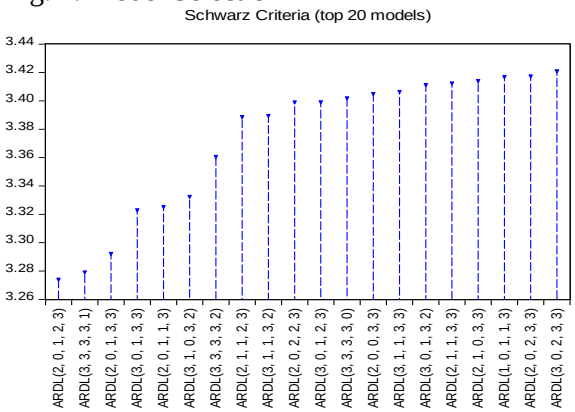

Table 3

Results of short-run

Variable	Coefficient
C	-10.05701*
TREND	1.435730*
ΔPCREDT(-1)	-0.431645*
ΔLR	0.401083***
ΔM3_GDP	-0.079904
ΔM3_GDP(-1)	0.165288**
ΔTDC	16.21490**
ΔTDC(-1)	67.54104*
ΔTDC(-2)	36.95515*
ECM(-1)*	-0.917265*

*Represent <1% level, ** represent <5% level.

Table 4

Result of long-run relationship

Varia le	Coefficient
LGDP	5.058728*
LR	1.198939*
M3_GDP	0.200635**
TDC	-37.20820*

*Represent <1% level, ** Represent <5% level.

Table 5

Results of long-run Fully Modified Least Square (FMOLS)

Variable	Coefficient
LGDPG	53.84156*
PDCREDT	3.034485*
LR	1.428681*
M3_GDP	-1.786215*
TDC	-49.53413*
C	-100.4228*
@TREND	-0.825836*

*Represent <1%, **represent <5%.

Fig. 1. CUSUM test

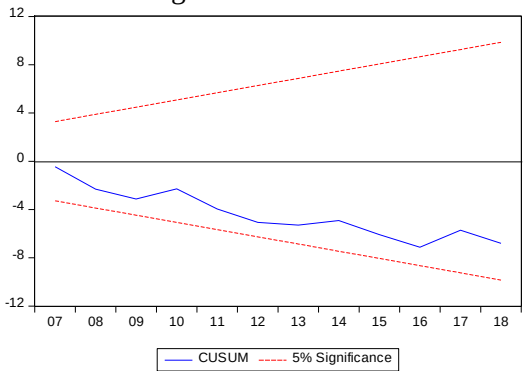

Fig. 2. CUSUM of the square test.