

Nar Bahadur Bista

Global College of Management, Nepal

Government Domestic Borrowing and Private Investment in Nepal

Abstract:

The proportion of domestic borrowing has been increasing in comparison to foreign borrowing in fiscal deficits in Nepal. This paper investigates the impact of domestic borrowing on private investment, interest rate, commercial banks loan to private sector and economic growth in Nepal. The study analyses the time series annual data from 1975 to 2011. The long run and short run relationships are established by using Autoregressive Distributed Lag (ARDL) and error correction models. The empirical results show that domestic borrowing has positive and significant impact on private investment and economic growth rate in long run and short run. Similarly, it has negative relationship with lending interest rate and no effect on the commercial banks loan to private sector in Nepal. The overall results empirically verify that the effect of domestic borrowing on private investment and economic growth rate is positive and confirms the Crowding-in effect as described by Keynesians in the case of Nepalese economy. Nepal, as being a developing country needs huge government fund for economic development. Government of Nepal can further utilize the domestic loan for government budget deficit financing.

Keywords: Fiscal deficit, domestic borrowing, private investment, interest rate, ARDL and ECM models.

JEL Classification: E62, H62, C32

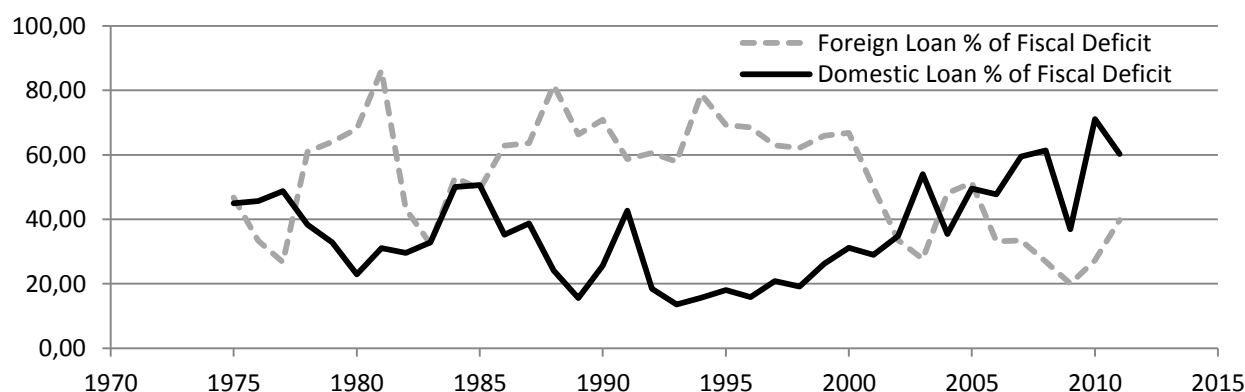
1 Introduction

Fiscal deficit results when tax revenue of a government does not fully cover its expenditures and public debt is an accumulation of yearly deficits. There are various sources of budget deficit financing and domestic and foreign borrowings are the major sources. The borrowings from any sources may have their own positive and negative macroeconomic implications in an economy. In this paper, we discuss the domestic borrowing and its impact on private investment. Economic theory suggests that deficit financing borrowing from domestic source reduces the loanable funds available for private investment, driving up interest rates, and reducing the level of private investment which is often called “Crowding-Out” effect. If, as Keynesians argue, the positive impact of increased government investment outweighs the negative impact of reduced private investment then economic growth will increase which is a case of “Crowding-In” (Mitra, 2006). Thus, the effect of government investment through domestic borrowing may have “Crowding-out or Crowding-in or Neutral” effect on private investment (Abdullatif Alani, 2006). The effect varies from one country to another and even it may vary in different time periods in a same country.

Nepal is a developing country with abundant natural resources and rich in bio-diversity with high potential of economic growth surrounded by two fastest growing Asian economies, India and China. Government expenditure, receipts (including grants) and fiscal deficits are 23.70 percent,

19.72 percent and 3.98 percent of nominal GDP respectively at the end of fiscal year 2010/11. The net outstanding external debt is 20.82 percent, internal debt is 14.78 percent and total public debt is 35.60 percent of nominal GDP in the same period. Average foreign loan and domestic borrowings are 52.76 and 35.90 out of total fiscal deficit from 1975 to 2011. The proportion of foreign loan was 66.86 percent of total fiscal deficit in 1999/2000 which is 39.76 percent in 2010/11. The proportion of domestic borrowing was 31.13 percent in 1999/2000 and it is 60.23 percent of total fiscal deficit in 2010/11. This data clearly indicates that the government budget deficit has been shifting towards domestic borrowings (MoF, 2012).

Figure 1: Foreign and Domestic Loan as a Percent of Total Fiscal Deficit in Nepal (1975-2011)



Source: Economic Survey Various Issues, Ministry of Finance, Nepal

The research questions can be raised as: Does the government domestic borrowing increase the interest rate and crowd-out private investment in Nepal? Does it create shortage of loanable fund to private sector from the commercial banks? And what is the impact of domestic borrowing on the economic growth rate of Nepal? In order to answer these crucial points, this paper aims to investigate the impact of government domestic borrowing on private investment, interest rate, commercial banks loan to private sector and economic growth rate in Nepal.

2 Literature review

The effect of government investment through domestic borrowing on private investment is whether “Crowding-Out or Crowding-In or Neutral”, it is still a debatable issue. Regarding the issue, the Neoclassical economists argue that budget deficits increase current consumption which causes a decrease in saving. Interest rates must rise to bring equilibrium to capital markets. High interest rates, in turn, result in a decline in private investment. Thus, budget deficits could “crowd-out” private investment. There are *Keynesians* who provide a counter argument to the crowding-out effect by making a reference to the expansionary effects of budget deficits. They argue that usually budget deficits result in an increase in domestic production, which makes private investors to become more optimistic about the future course of the economy and invest more. This is known as the “crowding-in” effect. Another possibility is that investment is not only a function of interest rate; it is also a positive function of income level. Increase in government expenditure increases income through multiplier process. This increased income induces the investment. The positive impact of induced investment may offset the negative impact of interest effect of deficit financing. Consequently, there will be increase in investment by private sector which is crowding-in effect (Abdullatif Alani, 2006). Another theory on budget deficits is the “Ricardian Equivalence Theorem” was propounded David Ricardo and Barro made it advanced. Barro (1974) argues that an

increase in budget deficits, say, due to an increase in government spending must be paid either now or later, with the total present value of receipts fixed by the total present value of spending. Hence, a cut in today's taxes must be matched by an increase in the future taxes, leaving interest rates, thus, private investment remains unchanged.

Many researchers empirically investigated the effect of government budget deficit and domestic borrowing on private investment, economic growth, interest rates and other macroeconomic variables in different economies. There are mixed results found in the investigations. Balassa (1988) investigated data for developing country, Clements and Levy (1994) examined the data in Caribbean, Nazmi and Ramirez (1997) in Mexico, Degirmen (2007) in Turkey, Paiko (2012) in Nigeria, Charles (2012) in Nigeria, and Fayed (2012) in Egypt found that fiscal deficit and domestic borrowings have crowding-out effect in the economy. In contract to the findings, Greene and Villanueva (1991) and Ghura and Goodwin (2000) investigated for developing countries, Musalem (1989) in Mexico, Looney and Frederiken (1997) in Pakistan, Pereira and Flores de Frutos (1999) in USA, Pereira (2000) in USA, Ribeiro and Teixeira (2001) in Brazil, Ouattara (2004) in Senegal, Mitra (2006) in India, Abdullatif-Alani (2006) in Japan, Majumber (2007) in Bagladesh, Maana, Owino, and Mutai (2008) in Kenya and Sheikh, Faridi, and Tariq (2010) in Nigeria found the evidence of crowding-in effect. Thus, the effect may vary whether it is crowding-out or crowding-in from country to country and time to time depending on the situation of the economy.

3 Data and methodology

This study uses annual time series data and it covers the period 1975 to 2011. The data are obtained from Various Economic Survey Reports of Ministry of Finance, Government of Nepal. All the nominal data are converted into ratio of nominal GDP of the corresponding years. The variables are defined as percentage ratio of government loan from commercial banks to nominal GDP (CBSLG), percentage ratio of commercial banks loan to private sector to nominal GDP (CBSLP), percentage ratio of domestic loan to nominal GDP (DL), percentage ratio of foreign loan to nominal GDP (FL), annual average lending interest rate of commercial banks in Nepal (LINT), percentage ratio of private investment to nominal GDP (PINV), and annual percentage change in real GDP of Nepal (Y). A dummy variable D90 is also introduced to capture whether there is any impact of democracy after 1990. It is equals to "1" after establishment of democracy in 1990 and otherwise it is "0".

The objective of the study is to establish the long run and short run relationship among the variables. The econometric technique applied to analyze data is Autoregressive Distributed Lag (ARDL) model for cointegration test. Though, the order of integration is not necessarily to be same for the coitegartion in ARDL approach, but generally the data should be stationary maximum of two time differences i.e. second difference (Pesaran et al., 2001). In order to test the unit root, Augmented Dickey-Fuller (ADF) test has been employed which is most common and widely used test in literatures.

The short-run and long-run parameters with appropriate asymptotic inferences can be obtained by applying OLS to ARDL with an appropriate lag length. The ARDL with Alkaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) estimators have very similar small-sample performances. ARDL-SBC has performed slightly better than ARDL-AIC in the majority of the experiments (Pesaran & Shin, 1997). Therefore, in this study SBC is used for lag selection while applying ARDL approach for small samples in this case. Following Pesaran et al. (2001), an ARDL ($p, q, r, \dots, m$) representation can be written as:

$$\Delta Y_t = \kappa_0 + \sum_{i=1}^p \alpha_{0i} Y_{t-i} + \sum_{j=0}^q \alpha_{1j} X_{1t-j} + \sum_{k=0}^r \alpha_{2k} X_{2t-k} + \dots + \sum_{l=0}^m \alpha_{nl} X_{nt-l} + \sum_{i=1}^p \beta_{0i} \Delta Y_{t-i} + \sum_{j=0}^q \beta_{1j} \Delta X_{1t-j} + \sum_{k=0}^r \beta_{2j} \Delta X_{2t-k} + \dots + \sum_{l=0}^m \beta_{nl} X_{nt-l} + \dots + u_t \quad \text{..... (1)}$$

Where, Y is dependent variable, Xi are independent variables and i=1,2, ..., n, Δ is the first difference operator and u_t is the usual white noise residuals. The coefficients (α_0 - α_n) represent the long-run relationship whereas the remaining expressions with summation sign (β_0 - β_n) represent the short-run dynamics of the model. The values (p,q,r,...,m) show the number of lags of the corresponding variables. The F-statistics is used for testing the existence of long run relationships. The ARDL level relationship is tested by Wald-test of coefficient restrictions setting hypothesis as:

$$H_0 : \alpha_0 = \alpha_1 = \alpha_2 = \dots = \alpha_n = 0, \text{ i.e. there is no level effect.}$$

$$H_1 : \alpha_0 \neq \alpha_1 \neq \alpha_2 \neq \dots \neq \alpha_n \neq 0, \text{ i.e. there is significant level effect.}$$

The calculated F-statistic is compared with lower bound and upper bound critical values to take the decision. If the calculated F-statistic lies between the bounds, the test is inconclusive. If it is above the upper bound, the null hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of no level effect can't be rejected. In this study, the data are processed by using Microfit 5.0 software which has an in-built facility to calculate the critical values on the basis of sample size (Pesaran & Pesaram, 2009).

After confirming the cointegration relationship among the variables, the estimated long run model using the ARDL approach of above model (1) can be expressed as:

$$Y_t = \kappa_1 + \alpha_1 X_{1t} + \alpha_2 X_{2t} + \dots + \alpha_n X_{nt} + (ect)_t \quad \text{..... (2)}$$

The error correction representation based on the assumptions made by Pesaran et al. (2001) of the ARDL model (1) can be expressed as:

$$\Delta Y_t = \kappa_2 + \sum_{i=1}^p \beta_{0i} \Delta Y_{t-i} + \sum_{j=0}^q \beta_{1j} \Delta X_{1t-j} + \sum_{k=0}^r \beta_{2j} \Delta X_{2t-k} + \dots + \sum_{l=0}^m \beta_{nl} \Delta X_{nt-l} + \lambda ect_{t-1} + \omega_t \quad \text{..... (3)}$$

The error correction term $(ect)_t$ is calculated from equation (2) and the coefficient of $(ect)_{t-1}$ i.e. λ indicates the long run dynamics. The coefficient λ also measures the speed of adjustment towards equilibrium if disequilibrium exists in long run. The λ should possess negative sign and it should be statistically significant to confirm the long run relationship between the variables. The coefficients (β_0 - β_n) in the model (3) show the short run impact of corresponding independent variables on dependent variable (Narayan, 2004).

The regression estimations are tested for goodness of fit and overall significance by R-squared/R-bar squared and F-test, statistical significance of the coefficients are tested by t-test. Other residuals diagnostic tests are the Lagrange multiplier test of residual serial correlation, the Ramsey's RESET test for functional form using the square of the fitted values, the normality test based on a test of

skewness and kurtosis of residuals and the heteroscedasticity test based on the regression of squared residuals on squared fitted values. All the data are processed in Mircofit 5.2 and Eviews-7 software. The paper has used Harvard referencing style for citation and referencing.

4 Empirical results and findings

4.1 Unit Root Test

In this study time series data from 1975 to 2011 which are discussed in data and methodology section are analyzed. Augmented Dickey-Fuller (ADF) test is employed to test the unit root. The results of ADF-test are presented in table 4.1 below:

Table 4.1: ADF-Test Results for Unit Root Test				
Variables	Levels		First Difference	
	t-Statistics	p-Value	t-Statistics	p-Value
DL	-2.767178	0.0731	-5.867359*	0.0000
FL	-1.521703	0.5114	-5.855334*	0.0000
PINV	-1.061095	0.7203	-7.128779*	0.0000
CBSLG	-1.241301	0.6457	-5.391723*	0.0001
CBSLP	0.838498	0.9934	-4.436297*	0.0012
LINT	-1.039929	0.7283	-5.045256*	0.0002
Y	-6.141317	0.0000*		
ADF Test critical values		1% level	-3.632900	
		5% level	-2.948404	
		10% level	-2.612874	

The symbols * and ** indicate data is stationary at 1 and 5 percent level of significant respectively. In table 4.1, we can observe that DL, FL, PINV, CBSLG, CBSLP and LINT have unit root at levels showing that these are non-stationary. These data are stationary at first difference at 1 percent level of significance. The data series Y is stationary at level at 1 percent significance level. The ADF test for unit root for all the data is tested with intercept and without trend. After testing the unit roots of the variables, we can run the ARDL estimation approach to cointegration to establish the relationship among the variables.

4.2 Domestic Loan, Private Investment and Lending Interest Rate

In the following table, the results of ARDL model are presented where PINV is dependent variable and LINT and DL are independent variables. To find the effect of democratic government after 1990, a dummy variable D90 has been intervened in the model. D90 is '1' when there is democracy after 1990 till the date, otherwise it is '0'. The ARDL (1,0,0,1) estimation and F-statistic to find the cointegration among the variables for bound testing is reported in table 4.2. The calculated value of F-statistic is 5.41, which is greater than the 95 percent upper bound critical value showing that the variables are cointegrated.

The estimated long run coefficients of the model are also presented in the same table 4.2. There is negative relationship between PINV and LINT. The coefficient of LINT is also significant at 10 percent level and it shows that 1 percent increase in LINT causes 0.34 percent decrease in PINV and vice versa in long run. The coefficient of DL is positive and it statistically significant at 10 percent level. The coefficient of DL is 1.01 which shows that 1 percent increase in DL causes 1.01 percent increase in PINV and vice versa in long run. The dummy variable has the positive and significant impact on PINV which means democracy is favorable situation for PINV in Nepal.

Table 4.2: ARDL(1,0,0,1) Model: PINV on LINT, DL and D90

Bound Testing Result for Existence of Level Relationship				
F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
5.4132	3.6362	4.8636	2.9686	4.0734
Estimated Long Run Coefficients				
Regressor	Coefficient	Standard Error	t-Ratio [Prob]	
LINT	-0.34225	0.20586	-1.6626 [0.087]	
DL	1.0146	0.60229	1.6845 [0.097]	
D90	6.3335	1.1313	5.5986 [0.000]	
C	13.2606	3.6132	3.6701 [0.001]	
R-Squared = 0.9117		R-Bar-Squared =0.8964		
F-Stat.	F(5,30) = 59.88 [0.000]		DW-statistic = 2.3665	
Diagnostic Tests				
Test Statistics	LM Version		F- Version	
Serial Correlation	CHSQ(1) = 2.345 [0.126]		F(1,28)=2.01[0.16]	
Functional Form	CHSQ(1) = 1.111 [0.292]		F(1,28)= 0.91[0.34]	
Normality	CHSQ(2) = 1.380 [0.50]			
Heteroscedasticity	CHSQ(1) = 0.043 [0.835]		F(1,33)= 0.04[0.84]	

The value of R-Squared is 0.91 which shows that about 91 percent variation due to explanatory variables is explained by the regression equation. The F-statistic is also significant at 1 percent level showing the overall significance of the regression equation. The diagnostic tests show that there is no autocorrelation, normality assumption of the residual is not violated and the no heteroscedasticity in the variance of the residuals.

The error correction representation of the model shows the short run coefficients. The short run coefficients of LINT, DL and D90 are not significant at 5 percent level. But, the coefficient of ΔDL is significant at 10 percent level. It shows that 1 percent increase in DL causes 0.43 percent increase in PINV and vice versa in short run. The coefficient of $ect(-1)$ is statistically significant and negative showing that there is long run association among the variables and about 42 percent disequilibrium can be adjusted towards equilibrium in this model.

Table 4.3: ARDL (1,0,0,1) Model: Dependent Variable is $\Delta PINV$

Error Correction Representation			
Regressor	Coefficient	Standard Error	t-Ratio [Prob]
$\Delta LINT$	-0.14489	0.10571	-1.3706 [0.181]
ΔDL	0.42951	0.22278	1.9279 [0.063]

$\Delta D90$	-0.70176	1.2284	-.57126 [0.572]
ect(-1)	-0.42333	0.11145	-3.7986 [0.001]
R-Squared = 0.4318		R-Bar-Squared = 0.3339	
F-Stat. F(4,31) = 4.2022[.008]		DW-statistic = 2.3665	

In conclusion, domestic borrowing has positive and significant impact on private investment in short run and long run in Nepal.

4.3 Commercial Banks Loan to Government, Private Investment and Lending Interest Rate

In the following analysis government borrowing from commercial banks (CBSLG) is taken instead of total domestic borrowing (DL). The ARDL estimation is performed where PINV is dependent variable and LINT, CBSLG and D90 are independent variables. The ARDL (1,0,0,1) estimation and F-statistic to find the cointegration among the variables for bound testing is reported in table 4.1. The calculated value of F-statistic is 7.81 and it is greater than the 95 percent upper bound critical value showing that the variables have long run relationship i.e. there is cointegration among the variables.

Table 4.4: ARDL(1,0,0,1) Model: PINV on LINT, CBSLG and D90

Bound Testing Result for Existence of Level Relationship				
F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
7.8142	3.6362	4.8636	2.9686	4.0734

Estimated Long Run Coefficients

Regressor	Coefficient	Standard Error	t-Ratio [Prob]
LINT	-0.1710	0.16181	-1.0572 [0.299]
CBSLG	0.7044	0.2070	3.4031 [0.002]
D90	3.5608	0.9077	3.9226 [0.000]
C	10.7768	2.7821	3.8736 [0.001]

R-Squared = 0.9287	R-Bar-Squared = 0.9165
F-Stat. F(5,30) = 75.63[0.000]	DW-statistic = 2.4402

Diagnostic Tests

Test Statistics	LM Version	F Version
Serial Correlation	CHSQ(1) = 3.653 [0.066]	F(1,28)=3.2632 [0.082]
Functional Form	CHSQ(1) = 0.027 [0.869]	F(1,28)=.0217 [0.884]
Normality	CHSQ(2) = 0.053 [0.974]	
Heteroscedasticity	CHSQ(1) = 0.659 [0.417]	F(1,33)=0.633 [0.432]

In same table 4.4, the estimated long run coefficients of the ARDL (1,0,0,1) model are presented. There is again negative relationship between PINV and LINT. But the coefficient of LINT is not significant even at 10 percent level. The coefficient of CBSLG is positive and it is statistically significant at 5 percent level. It exhibits that 1 percent increase in CBSLG causes 0.70 percent increase in PINV and vice versa in long run. The dummy variable has the positive and significant impact on PINV in this model as well.

The value of R-Squared is 0.93 which shows that about 93 percent variation due to explanatory variables is explained by the regression equation. The F-statistic is also significant at 1 percent level showing the overall significance of the regression equation. The diagnostic tests show that there is no autocorrelation, normality assumption of the residual is not violated and the no heteroscedasticity in the variance of the residuals.

Table 4.5: ARDL (1,0,0,1) Model: Dependent Variable is Δ PINV

Error Correction Representation			
Regressor	Coefficient	Standard Error	t-Ratio [Prob]
Δ LINT	-0.094	0.0968	-0.9750 [0.337]
Δ CBSLG	0.388	0.1143	3.4006 [0.002]
Δ D90	-1.099	1.1123	-0.9884 [0.331]
ect(-1)	-0.551	0.1057	-5.2189 [0.000]
R-Squared = 0.5417		R-Bar-Squared = 0.4627	
F-Stat. F(4,30) = 8.57[.000]		DW-statistic = 2.4402	

The error correction representation of the model is shown in table 4.5. The short run coefficients of LINT and D90 are not significant at 5 percent level. But the coefficient of Δ CBSLG is significant at 1 percent level. It shows that there is short run association between CBSLG and PINV. The relationship shows that 1 percent increase in CBSLG causes 0.39 percent increase in PINV and vice versa in short run. The coefficient of ect(-1) is negative and statistically significant at 1 percent level. The speed of adjustment towards equilibrium is 55 percent in each year if disequilibrium occurs in the model. The model can be summarized as there is positive and significant relationship between government borrowing from commercial banks and private investment in short run and long run in Nepal.

4.4 Domestic Borrowing and Commercial Banks Loan to Private Sector

After examining the relationship of private investment to domestic borrowing and others, we tried to find the relationship of commercial banks loan to private sector with other variables in this part. The commercial banks loan to private sector as a percentage of GDP (CBSLP) is dependent variable and LINT, DL and PINV are independent variables in this ARDL model. The level relationship among the variables for the ARDL (1,2,0,2) is presented in table 4.6. The F-statistic for bound testing for existence of long run relationships shows that there is cointegration among the variables at 10 percent level of significance. It means the variables are weakly associated in long run.

The estimated long run coefficient of LINT shows that it has highly insignificant impact on CBSLP. The coefficient of DL is negative but it is also not significant even at 10 percent level. The relationship between PINV and CBSLP is positive and significant at 1 percent level. It shows that 1 percent increase in PINV causes 4.61 percent increase in CBSLP and vice versa in long run.

The coefficient of determination measured by R-squared shows that 99 percent variation due to explanatory variables to dependent variable can be explained by the regression equation. The overall significance of the regression equation is also significant at 1 percent level shown by the F-statistic. The other diagnostic tests also confirm that there is no evidence of serial correlation, the residuals are normally distributed and the functional form is also significant at 5 percent level except the model is suffered from heteroscedasticity problem.

Table 4.6: ARDL(1,2,0,2) Model: CBSLP on LINT, DL and PINV

Bound Testing Result for Existence of Level Relationship				
F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
4.1133	3.6362	4.8636	2.9686	4.0734
Estimated Long Run Coefficients				
Regressor	Coefficient	Standard Error	t-Ratio [Prob]	
LINT	0.0002	0.93312	0.0002 [1.00]	
DL	-1.1217	2.1168	-0.52992 [0.601]	
PINV	4.6165	0.80371	5.7439 [0.000]	
C	-33.1774	21.0429	-1.5767 [0.127]	
R-Squared =0.9933		R-Bar-Squared =0.9913		
F-Stat. F(8,26)= 485.54[0.000]		DW-statistic = 2.0835		
Diagnostic Tests				
Test Statistics	LM Version		F Version	
Serial Correlation	CHSQ(1) = 0.511 [0.474]		F(1,25)=0.370[0.548]	
Functional Form	CHSQ(1) = 1.763 [0.184]		F(1,25)=1.326[0.260]	
	Normality	CHSQ(2) = 1.036 [0.596]		
Heteroscedasticity	CHSQ(1) = 14.186 [0.000]		F(1,33)=22.493[0.000]	

The short run relationship is established by error correction representation of the model in table 4.7. The coefficient of $ect(-1)$ is negative and statistically significant at 1 percent level. This again confirms that there is a long run relationship among the variables. The feedback coefficient is -0.14. It suggests that 14 percent of the previous year's deviation in CBSLP from its equilibrium path is corrected over the following year. This result implies that the adjustment process to equilibrium is quite slow. Though the coefficient of $\Delta LINT$ not significant, the coefficient of one period lagged i.e. $\Delta LINT(-1)$ is negative and significant at 5 percent level. It shows that there is negative and lagged effect of LINT on CBSLP in short run. Likewise, the coefficient of ΔDL and $\Delta PINV$ are not significant even at 10 percent level. The coefficient of one period lagged PINV

i.e. $\Delta\text{PINV}(-1)$ is negative and statistically significant at 5 percent level. It shows that one period lagged PINV has negative impact on CBSLP in short run.

The goodness of fit of the regression equation observed by R-squared and R-bar squared give so not satisfactory result. The overall statistical significance of the regression equation is observed by the F-statistic which is also significant at 1 percent level. This analysis comes to the conclusion that the impact of domestic borrowing on the commercial banks loan to private sector is insignificant in short run and long run. In other words, loan to private sector by the commercial banks is not affected by the government domestic borrowing in Nepal.

Table 4.7: ARDL (1,2,0,2) Model: Dependent Variable is ΔCBSLP

Error Correction Representation			
Regressor	Coefficient	Standard Error	t-Ratio [Prob]
ΔLINT	-0.041334	0.24941	-0.16572 [0.870]
$\Delta\text{LINT}(-1)$	-0.57160	0.23770	-2.4048 [0.023]
ΔDL	-0.15597	0.27339	-0.57048 [0.573]
ΔPINV	0.14089	0.16784	0.83944 [0.408]
$\Delta\text{PINV}(-1)$	-0.45980	0.18874	-2.4362 [0.021]
ect(-1)	-0.13904	0.050587	-2.7486 [0.010]
R-Squared = 0.5307		R-Bar-Squared = 0.3863	
F-Stat. F(6,28)=4.90[0.002]		DW-statistic = 2.0835	

4.5 Domestic Loan, Foreign Loan and Economic Growth

Finally, this study tries to examine the impact of domestic and foreign borrowing on the economic growth rate of Nepal. The economic growth rate (Y) is taken as dependent variable and domestic loan (DL) and foreign loan (FL) are taken as explanatory variable in the model to observe the impact of both type of borrowings on Y. The level relationship among the variables for the ARDL (2,0,0) is presented in table 4.8. The F-statistic for bound testing for existence of long run relationships shows that there is cointegration among the variables at 5 percent level of significance. The estimated long run coefficients of the independent variables are also reported in the same table 4.8. The coefficient of DL is 0.38 and FL is 0.55 which are statistically significant at 5 percent level. Both of the borrowings have positive impact but impact of FL is comparatively higher than the impact of DL on Y in Nepal.

The regression equation can explain 43 percent variation in Y due to explanatory variables. The overall significance of all the regression coefficients are also significant at 1 percent level. The other diagnostic tests show that there is no evidence of serial correlation and the residuals are normally distributed. Similarly, there is no heteroscedasticity problem in the variance of the residuals and functional form is also significant at 5 percent level. Therefore, the model is correctly specified.

Table 4.8: ARDL(2,0,0) Model: Y on DL and FL

Bound Testing Result for Existence of Level Relationship				
F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
13.8186	4.2145	5.3379	3.4213	4.4376

Estimated Long Run Coefficients

Regressor	Coefficient	Standard Error	t-Ratio [Prob]
DL	0.38449	0.18621	2.0648 [0.048]
FL	0.55548	0.10818	5.1348 [0.000]
C	1.8433	0.49315	3.7378 [0.001]

R-Squared=0.43008

R-Bar-Squared=0.35409

F-Stat. F(4,30)=5.6598[0.002]

DW-statistic=1.8982

Diagnostic Tests

Test Statistics	LM Version	F Version
Serial Correlation	CHSQ(1)=0.143 [0.705]	F(1,29)=0.119[0.732]
Functional Form	CHSQ(1)=0.007 [0.993]	F(1,29)=0.0006[0.994]
Normality	CHSQ(2)=0.481 [0.786]	
Heteroscedasticity	CHSQ(1)=0.003 [0.953]	F(1,33)=0.003[0.955]

The short run relationship is presented by error correction model in table 4.9. The coefficient of $ect(-1)$ is negative and statistically significant at 1 percent level. The coefficient of one period lag of Y i.e. $\Delta Y(-1)$ is positive and significant at 1 percent level. It shows that there is positive impact of lagged value of the economic growth rate on Y in short run. Likewise, the coefficient of ΔDL and ΔFL are 0.68 and 0.99 respectively which are statistically significant and both have positive short run effect on Y. The short run effect of FL is also higher than the effect of DL in the study period. The value of R-squared and R-bar squared and F-statistic give the satisfactory result for the goodness of fit of the regression equation.

Table 4.9: ARDL (2,0,0) Model: Dependent Variable is ΔY

Error Correction Representation			
Regressor	Coefficient	Standard Error	t-Ratio [Prob]
$\Delta Y(-1)$	0.44880	0.15304	2.9326 [0.006]
ΔDL	0.68315	0.33944	2.0126 [0.050]
ΔFL	0.98695	0.22756	4.3372 [0.000]
$ect(-1)$	-1.7768	0.23744	-7.4830 [0.000]
R-Squared=0.72345		R-Bar-Squared=0.68657	
F-Stat. F(4,30)=19.61[0.000]		DW-statistic=1.8982	

The results of the model can be summarized as domestic loan and foreign loan have positive and highly significant impact on economic growth in long run and short run. The positive effect of foreign loan on economic growth rate is higher than the effect of domestic loan in Nepal.

5 Summary, conclusions and policy implications

The effect of government investment through domestic borrowing on private investment is whether Crowding-out (negative effect) or Crowding-in (positive effect) or Neutral (no effect, it is still a debatable issue on the theoretical grounds. Neoclassical economists put forward the argument in favor of Crowding-out whereas Keynesians argue for Crowding-in and Ricardian equivalence theorem explains the neutral effect of domestic borrowing on private investment and economic growth. The empirical results of the researchers are also found mixed in the studies. In Nepal, proportion of domestic borrowing in comparison to foreign loan has been increasing in recent years. This paper focuses to examine the empirical relationship of government domestic borrowing with private investment, commercial banks loan to private sector, lending interest rate and economic growth of Nepal. Annual time series data from various issues of Economic Survey Reports of Nepal are analyzed covering the period 1975 to 2011. The econometric techniques employed in the study are Augmented Dickey-Fuller (ADF) test for unit root, Autoregressive Distributed Lag (ARDL) approach to cointegration and its error correction representations.

The empirical results show that government domestic loan (DL) has positive effect on private investment (PINV) in short run and long run. The government borrowing from commercial banks (CBSLG) has also positive and significant effect on PINV in long run and short run. The effect of DL on Commercial banks loan to private sector (CBSLP) is not significant showing that DL does not affect CBSLP. It is also observed that CBSLP significantly depends on PINV in positive direction and it has no relationship with lending interest rate in long run and short run. The effect of domestic as well as foreign loan on economic growth rate is positive and statistically significant in long run and short run. However, the positive effect of government foreign loan is higher than the effect of government domestic loan in long run and short run in Nepal. The overall results empirically verify that the effect of domestic borrowing on private investment and economic growth rate is positive and confirms the Crowding-in effect as described by Keynesians in the case of Nepalese economy. Nepal, as being a developing country needs huge government fund for economic development. Government of Nepal can further utilize the domestic loan for government budget deficit financing.

References:

- Abdullatif Alani, E. M. (2006). *Crowding-out and Crowding-in Effects of Government Bonds Market on Private Sector Investment (Japanese Case Study)*. Available at: <http://www.ide.go.jp/English/Publish/Download/Dp/pdf/074.pdf> (Accessed March 08, 2013).
- Akca, O. C., Alper, C. E., & Ozmur, S. (1996). *Budget Deficit, Money Supply and Inflation: Evidence from Low and High Frequency Data for Turkey*. Istanbul: Bogazici University, Department of Economics. Available at: http://edoc.bibliothek.uni-halle.de/servlets/MCRFileNodeServlet/HALCoRe_derivate_00005580/ISS_EC_96_12.pdf (Accessed 11 04, 2012).
- Balassa, B. (1988). *Public Finance and Economic Development*. Washington D.C.: World Bank Working Paper No. 31. Available at: <http://www-wds.worldbank.org/servlet/>

- WDSContentServer/WDSP/IB/1988/08/01/000009265_3960927021107/Rendered/PDF/multi_page.pdf (Accessed March 8, 2013).
- Barro, R. (1974). Are Government Bonds Net Wealth? *Journal of Political Economy*, 82(6), 1095-1117.
- Catao, L., & Terrones, M. (2005). Fiscal Deficit and Inflation. *Journal of Monetary Economics*, 52(3), 529-554.
- Charles, O. (2012). Domestic Debt and the Growth of Nigerian Economy. *Reasearch Journal of Finance and Acccounting*, 3(5), 45-57.
- Chimobi, O., & Lgwe, O. (2010). Budget Deficit, Money Supply and Inflation in Nigeria. *European Journal of Economics, Finance and Administrative Sciences*(19), 52-59.
- Clements, B., & Levy, J. V. (1994). *Public Education Expenditure and Other Determinants of Private Investment in the Caribbean*. Washington, D.C.: IMF Working Paper 94/122.
- Degirmen, S. (2007). Crowding Out, Interest and Exchange Rate Shocks, and Bank Lending: Evidence from Turkey. *International Research Journal of Finance and Economica*, 76-87.
- Edwards, S., & Tabellini, G. (1991). Explaining Fiscal Policies and Inflation in Developing Countries. *Journal of International Money and Finance*, 10(1), 16-48.
- Ekanayake, H. (2012). *The Link between Fiscal Deficit and Inflaion: Do Public Sector Wages Matter?*. ASARC Working Paper 2012/14.
- Ezeabasili, V., Mojekwu, J., & Herbert, W. (2012). An empirical Analysis of Fiscal Deficits and Inflation in Nigeria. *International Business and Management*, 4(1), 105-120.
- Fayed, M. E. (2012). *Crowding Out Effect of Public Borrowing: A Case of Egypt*. Cairo: Faculty of Economics and Political Science, Cairo University. Available at: <http://fesp-eg.org/wp-content/uploads/2012/02/Mona-Essam-Crowding-Out-Effect-of-Public-Borrowing-The-Case-of-Egypt.pdf> (Accessed March 10, 2013)
- Friedman, M. (1956). *The Quantity Theory of Money: A Restatement*. Chicago: University of Chicago Press.
- Ghura, D., & Goodwin, B. (2000). Determinants of Private Investment: A Cross-Regional Empirical Investigation. *Applied Economics*, 32(14), 1819-1829.
- Granger, C. (1969). Investigating Causal Relation by Econometric Models and Cross-spectral Methods. *Econometrica*, 37(3), 424-438.
- Greene, J., & Villanueva, D. (1991). *Private Investment in Developing Countries: An Empirical Analysis*. Washington, D.C.: IMF Staff Papers 38 (1) pp.33-58.
- Gujarati, D. (2003). *Basic Econometrics* (Fourth ed.). MacGraw Hill.
- Jha, R. (2001). *Macroeconomics of Fiscal Policy in Developing Countries*. World Institute for Development Economic Research (WIDER), Finland. Available at: <http://hdl.handle.net/1885/40625> (Accessed March 4, 2013).
- Looney, R. E., & Frederiken, P. C. (1997). Government Investment and Follow-on Private Sector Investment in Pakistan, 1972-1995. *Journal of Economic Development*, 22(1), 91-100.
- Maana, I., Owino, R., & Mutai, N. (2008). Domestic Debt and Its Impact on the Economy: The Case of Kenya. Pretoria: Paper Presented During the 13th Annual African Econometric Society Conference in Pretoria, South Africa. Available at: http://www.africametrics.org/documents/conference08/day1/session2/maana_owino_mutai2.pdf(Accessed March 11, 2013).
- MacKinnon, J. (1996). Numerical Distribution Functions for Unit Root and Cointegration Tests. *Journal of Applied Econometrics*, 11(6), 601-618.

- Majumder, M. A. (2007). *Does Public Borrowing Crowd-out Private Investment? The Bangladesh Evidence*. Dhaka: Bangladesh Bank, Research Department. Available at: <http://siteresources.worldbank.org/PSGLP/Resources/WP0708Final.pdf> (Accessed November 01, 2012).
- Milo, P. (2012). The Impact of the Budget Deficit on the Currency and Inflation in the Transition Economies. *Journal of Central Banking Theory and Practice*, 25-57.
- Mitra, P. (2006). *Has Government Investment Crowded Out Private Investment in India?* Available at: http://www.aeaweb.org/assa/2006/0108_1015_0102.pdf (Accessed March 10, 2013).
- MoF. (2012). *Economic Survey 2011/12*. Kathmandu: Ministry of Finance, Government of Nepal.
- Mortaza, G. (2006). *Sources of Inflation in Bangladesh Recent Macroeconomic Experience*. Dhaka: Research Department, Bangladesh Bank., Working Paper Series: WP 0704. .
- Musalem, A. R. (1989). *Private Investment in Mexico: an Empirical Analysis*. Washington, D.C.: Working Paper Series No. 183, World Bank.
- Narayan, P. (2004). *Reformulating Critical Values for the Bounds F-statistics Approach to Cointegration: An Application to the Tourism Demand Model for Fiji*. Victoria: Monash University, Department of Economics, Australia, Discussion Papers.
- Nazmi, N., & Ramirez, M. D. (1997). Public and Private Investment and Economic Growth in Mexico. *Contemporary Economic Policy*, 15(1), 65-75.
- Ndanshau, M. (2012). *Budget Deficits, Money Supply and Inflation in Tanzania: A Multivariate Granger Causality Test, 1967 – 2010*. Working Paper Series No. 04/12.
- NLSS. (2011). *Nepal Living Standard Survey (NLSS) 2010/11*. Kathmandu: Central Bureau of Statistics, Government of Nepal.
- NRB. (2007). *Inflation in Nepal*. Kathmandu: Nepal Rastra Bank, Research Department.
- Ouattara, B. (2004). *Modelling the Long Run Determinants of Private Investment in Senegal*. Centre for Research in Economic Development and International Trade (CREDIT), University of Nottingham. 2013, Available at: <http://www.nottingham.ac.uk/credit/documents/papers/04-05.pdf> (Accessed March 10).
- Paiko, I. I. (2012). Deficit Financing and Its Implications on Private Sector Investment: The Nigerian Experience. *Arabian Journal of Business and Management Review*, 1(9), 45-62.
- PCI. (2012). *Some Macroeconomic Indicators of India*. New Delhi: Planning Commission, Government of India. 2012, Available at: <http://planningcommission.nic.in/data/datatable/index.php?data=datatab> (Accessed November 04).
- Pereira, A. M. (2000). Is All Public Capital Created Equal? *Review of Economics and Statistics*, 82(3), 513-518.
- Pereira, A. M., & Flores de Frutos, R. (1999). Public Capital and Private Sector Performance in the United States. *Journal of Urban Economics*, 46(99), 300-322.
- Pesaran, B., & Pesaran, M. H. (2009). *Time Series Econometrics Using Microfit 5.0*. Oxford University Press.
- Pesaran, H., & Pesaran, B. (1997). *Time Series Econometrics Using Microfit 4.0*. London: Oxford University Press.
- Pesaran, H., & Shin, Y. (1997). *An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis*. Oslo: A Revised Version of a Paper Presented at the Symposium at the Centennial of Ragnar Frisch, The Norwegian Academy of Science and Letters. Available at: <http://www.eprg.org.uk/faculty/pesaran/ardl.pdf> (Accessed November 18, 2012).
- Pesaran, M., Shin, Y., & Smith, R. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16, 289-326.

- Ribeiro, M., & Teixeira, J. (2001). *An Econometric Analysis of Private Sector Investment in Brazil*. CEPAL Review 74. 2013. Available at: http://www.eclac.org/publicaciones/xml/6/19906/lcg2135i_Ribeiro.pdf (Accessed March 09).
- Sargent, T., & Wallace, N. (1981). Some Unpleasant Monetary Arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*.
- Sheikh, M., Faridi, M., & Tariq, K. (2010). Domestic Debt and Economic Growth in Pakistan: An Empirical Analysis. *Pakistan Journal of Social Sciences*, 30(2), 373-387.
- Tiwari, A., & Tiwari, A. (2011). Fiscal Deficit and Inflation: An Empirical Analysis of India. *The Romanian Economic Journal*, XIV(42), 131-158.
- Tiwari, A., Tiwari, A., & Pandey, P. (2012). Fiscal Deficit and Inflation: What Causes What? The Case of India. *Journal of International Business and Economy*, 13(1), 57-81.
- WB. (2012). *The World Bank Database*. (Accessed Available at: <http://data.worldbank.org/country>)
- Wolde-Rufael, Y. (2008). Budget Deficit, Money and Inflation: The Case of Ethiopia. *The Journal of Developing Areas*, 42(1), 183-199.