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Original Paper

Analysis of the Relationship between Financial Development and Economic Growth: Evidence from Nepal

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Abstract

The present article aims to examine the link between financial development and economic growth in Nepal covering the period from 1979 to 2018. The study applies the method of Auto-Regressive Distributed Lag (ARDL) bound test cointegration approach to investigate both the long and short runs relationship among the variables. The empirical results found that the long-run cointegrated relationship between financial development and economic growth in Nepal. The findings clearly shows that financial development has a positive impact on economic growth both in the long-run as well as the short-run, which suggests that financial development has been a key contributor and an important engine of growth performance in the Nepalese economy. Moreover, the results may help policy makers to take into account financial development variable as an instrument for economic growth in the country.

Keywords

financial development, economic growth, ARDL, Nepal

1. Introduction

Today, financial sector development has been identified a universal phenomenon which plays a significant role in the economic growth performance in every corner of the world. The association between financial development and economic growth has been one of the vastly discussed subjects within academics and policy-makers in finance-growth literature (De Gregorio & Guidotti, 1995). Over the last four decades, a growing number of studies have been focused on the relationship between financial development and economic growth for different countries by using different methods (see, for example, Jung, 1986; King & Levine, 1993; Al-Yousif, 2002; Christopoulos & Tsionas, 2004; Apergis et al., 2007; Hassan et al., 2011; Law & Singh, 2014; Pradhan et al., 2017; Fuinhas et al., 2019; Guru &

Yadav, 2019). These prior empirical panel data studies have reported that financial development has a significant and positive connection with economic growth. Specifically, some recent researches have highlighted a time-series studies of the relationship between financial development and economic growth in different countries (for example, Liang & Teng, 2006; Ang & Mckibbin, 2007; Odhiambo, 2009; Jalil & Feridun, 2011; Hye & Islam, 2013; Sehrawat & Giri, 2015; Iheanacho, 2016; Türsoy & Faisal, 2018). Most of these earlier time-series studies have yielded mixed results (either positive or negative effect on economic growth) due to the choice of variables, choice of dissimilar methods as well as different time periods.

In the context of Nepal, up to now a little number of research works have analyzed the link between financial development and economic growth (see, for example, Kharel & Pokhrel, 2012; Oanh Thi Vuong, 2013; Paudel et al., 2018). Kharel and Pokhrel (2012) analyzed the role of financial structure in economic growth in Nepal from 1994 to 2011 utilizing the vector error correction model and found the banking sector played a significant role in promoting economic growth. Similarly, Oanh Thi Vuong (2013) examined the relationship between financial development and economy in Nepal from 1994 to 2011 by utilizing the multiple regression analysis method and found mixed or conflicting results in Nepal. Interestingly enough, the study found that only deposit has positive influence, whereas current deposit has negative impact on the Nepalese economy and other variables like credit and term deposit have not been found as drivers of the national economy. Paudel et al. (2018) analyzed the relationship between financial and real sector development with economic growth in the short run and long run covering the period from 1975 to 2015 by using Engle-Granger co-integration test, Error correction model and Granger causality test. The study found that finance-led growth yields positive consequences but the real sectors indicator like consumer price index has more impact on economic growth than financial development in Nepal. Generally, these former studies have yielded mixed or conflicting results due to the choice of different variables as well as the selection different study periods by using dissimilar methods. For this reason, this study have used long time spans (40 years) by using the Auto-Regressive Distributed Lag (ARDL) bound test cointegration approach of Pesaran et al. (2001) to fill up a gap in the literature of financial-economics.

The main goal of this study is to examine the link between financial development and economic growth for Nepal spanning the period from 1979 to 2018 by using the time series data technique. Specifically, this study applies the Auto-Regressive Distributed Lag (ARDL) bound test cointegration approach of Pesaran et al. (2001) to investigate both in the long-run and short-run effects of financial development on economic growth. To the best of the author knowledge, this is the first study that explores the impact of financial development on economic growth for Nepal by using the ARDL model spanning the period from 1979 to 2018.

The structure of this paper is organized as follows. Section 2 briefly describes the data sources and methodology used in this study. Section 3 provides the empirical results and discussion of the study. Finally, section 4 presents the conclusions.

2. Data and Methodology

2.1 Data Description

This paper used the annual data of Nepal for the period 1979-2018. The database is compiled from the World Bank, World Development Indicators (WDI, 2019) online data. The yearly data on Gross Domestic Product (GDP) per capita in constant 2010 US$ is used as a proxy of economic growth (*Y*) variable. The Nepalese financial system is mainly dominated by banking sector, therefore, this study used yearly data on the domestic credit provided by banking sector (% of GDP) as a proxy of financial development (*FD*).

This study used four control variables, namely, trade openness (*TO*), government expenditure (*GOV*), investment (*INV*), and inflation (*INF*). The first control variable is the trade openness (i.e., sum of exports and imports) which is measured as a percentage of the GDP. This control variable has directly influence of international trade on economic growth for Nepal. The government expenditure variable is defined as the ratio of general government final consumption expenditure and GDP and it is used as a proxy of fiscal policy for Nepal. The third control variable is the investment, defined as the ratio of gross fixed capital formation and GDP and used as a proxy of investment. The fourth variable is inflation, defined as the annual percentage change in the inflation of consumer price and it is used as proxy of macroeconomic stability. These all variables are transformed into natural logarithms and the length of study period from 1979 to 2018 was determined by the selected variables of data accessibility.

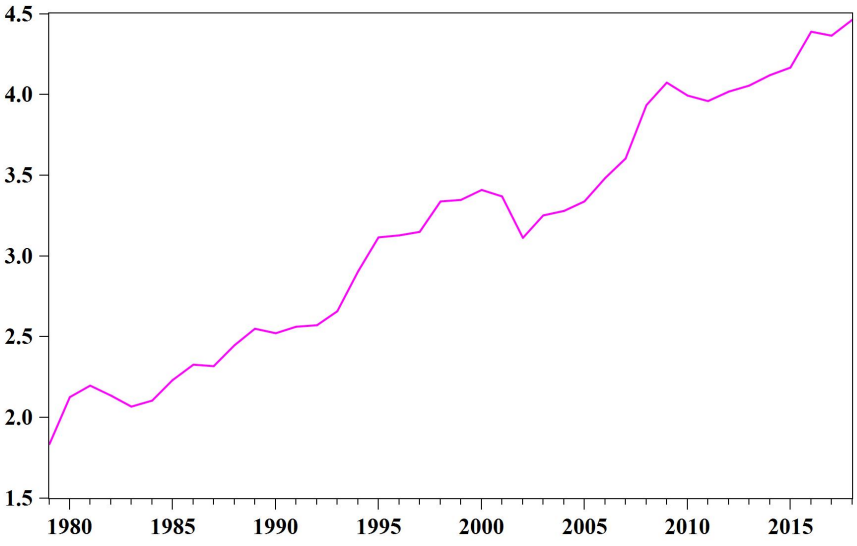

Figure 1. Evolution of Domestic Credit Provided by Banking Sector (as a % of GDP) over the Study Period 1979-2018

Figure 1 exhibits the trend of domestic credit provided by banking sector as a percentage of the GDP (financial development) for Nepal over the study period from 1979 to 2018. The figure demonstrates that the financial development is increasing till 2000 and after that declining up to the year 2002. Likewise, the financial development variable has been relatively falling during the study period between 2009 and 2011, whereas the figure shows an abstemiously rising for the remaining investigation period. Overall, the trend indicates that financial development variable has been slowly increasing during the study period 1979-2018 which suggests that financial development is a stimulus for growth performance of the Nepalese economy.

2.2 Methodology

This study applied the Auto-Regressive Distributed Lag (ARDL) bound test method of Pesaran et al. (2001) to examine the cointegration relationship between financial development and economic growth of Nepal during the period from 1979 to 2018. Nowadays, the ARDL bound test method has been widely used method in the finance-economics literature rather than those of prior cointegration methods, namely, Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990).

The ARDL model can be expressed as follows:

$$\Delta \ln Y_{it} = a_0 + \sum_{i=0}^{k} \theta_i \Delta \ln Y_{t-i} + \sum_{i=0}^{k} \varphi_i \Delta \ln FD_{t-i} + \sum_{i=0}^{k} \pi_i \Delta \ln TO_{t-i} + \sum_{i=0}^{k} \eta_i \Delta \ln GOV_{t-i} + \sum_{i=0}^{k} \Omega_i \Delta \ln INV_{t-i} + \sum_{i=0}^{k} \gamma_i \Delta \ln INF_{t-i} + \beta_1 \ln Y_{t-i} + \beta_2 lnFD_{t-1} + \beta_3 lnTO_{t-1} + \beta_4 lnGNV_{t-1} + \beta_5 lnINV + \beta_6 lnINF_{t-1} + u_t \quad (1)$$

In equation (1), Δ represents the first difference operator, *Y* represents the economic growth, *FD* represents the financial development, *TO* represents the trade openness, *GOV* represents the government expenditure, *INV* represents the investment, *INF* represents the inflation, *t* represents the time period, *Ln* represents the natural logarithms, α_0 represents the drift component, *u* is the error term and *k* represents the lag length. The parameters θ, φ, π, η, Ω *and* γ are the short-run coefficients as well as β_1, β_2, β_3, β_4, β_5 and β_6 are the long-run coefficients.

Next step of the ARDL bounds test approach is utilized herein to test the presence of the long run relationship among the variables (economic growth, financial development, trade openness, government expenditure, investment and inflation) by conducting an *F*-test. In equation (1), the approach specifies the null hypothesis is defined as H_0: $\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=\beta_6=0$ which suggesting that the non-existence of the long-run relationship among the variables although an alternative hypothesis (existence of cointegration) defined as H_1: $\beta_1\neq\beta_2\neq\beta_3\neq\beta_4\neq\beta_5\neq\beta_6\neq0$. The value obtained from the *F*-statistics is compared with two-sets of critical values (i.e., upper critical bounds and lower critical bounds) as tabulated by Pesaran et al. (2001). The upper critical bounds values assume that all variables are *I*(1), while the lower critical bounds values assume that all variables are *I*(0). If the computed *F*-statistics is higher than the upper critical value, then the null hypothesis of no cointegration is rejected which implies that there is a long-run connection lies among the variables, whereas if the

computed *F*-statistics falls the lower critical value the null hypothesis of no conitegration cannot be rejected, it means that there is an absence of cointegration among the variables (Pesaran & Pesaran, 1997).

After finding the long-run relationship, this investigation applied the short-run parameters that can be obtained by estimating an Error Correction Model (ECM) associated with a long-run estimates of the ARDL method (Pesaran et al., 2001) which is given by:

$$\Delta \ln Y_t = a_0 + \sum_{i=0}^{k} \theta_i \Delta \ln Y_{t-i} + \sum_{i=0}^{k} \varphi_i \Delta \ln FD_{t-i} + \sum_{i=0}^{k} \pi_i \Delta \ln TO_{t-i} + \sum_{i=0}^{k} \eta_i \Delta \ln GOV_{t-i} + \sum_{i=0}^{k} \Omega_i \Delta \ln INV_{t-i} + \sum_{i=0}^{k} \gamma_i \Delta \ln INF_{t-i} + \delta_i ECT_{t-i} + u_t \quad (2)$$

In equation (2), ECT_{t-1} is the error-correction terms, δ denotes the speed of adjustment and the rest of the notations are defined previously in the overhead equation (1).

In order to ascertain the goodness of fit of the ARDL model, this paper conducted both the diagnostic and stability tests. The diagnostic tests examine the serial correlation, normality, functional form and heteroscedasticity. This study also utilized herein the stability tests, viz., the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) proposed by Brown et al. (1975) to examine the stability of the long-run estimators based on the recursive estimates residual.

3. Results and Discussion

Before examining the ARDL model, the study applied herein the unit root tests (Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test) in order to check the stationary or non-stationary of all variables. The results of the ADF and PP unit root tests of the level and first difference for each of the variable (economic growth, financial development, trade openness, government expenditure, investment, and inflation) are reported in Table 1. All the variables at first difference of the ADF and PP unit root tests of the null hypothesis can be rejected at the 1% significance level. In this regard, the ADF and PP unit root tests is stationary as well as integrated of order one process (I (1)).

Table 1. Unit Root Test Results

Variables	ADF test (with trend and intercept)		PP test (with trend and intercept)	
	Level	First difference	Level	First difference
Y	-1.9600	-7.6622***	-1.7451	-10.5331***
FD	3.8608**	-5.5372***	2.9375	-5.5342***
TO	-1.7600	-4.8575***	1.7454	-4.8574***
GOV	-2.8841	-8.1870***	-3.2900*	-8.6745***

INV	-1.4960	-7.3811***	-1.7789	-7.2966***
INF	-3.5665**	-7.5029***	-5.0166***	-14.2110***

Note. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels of significance.

Table 2 reports the results of the ARDL bounds test for cointegration. The calculated *F*-statistics Ln*Y*/ln(*FD, TO, GOV, INV, INF*)=5.9775 are greater than the critical values (4.68) of the upper bound at the 1% level of significance. This result clearly indicates that the bound test evidence confirms the cointegrating relationship among economic growth, financial development, trade openness, government expenditure, investment and inflation for Nepal during the period from 1979 to 2018. After confirmation of the cointegrating relation among the variables, this study move to estimate the long-run coefficients.

Table 2. Results of ARDL Bounds Test

Model for estimation	*F*-Statistics	Significance level	Critical bound *F*-statistic	
			I(0) LCB	*I*(1) UCB
Ln*Y*/ln(*FD, TO, GOV, INV, INF)*	5.9775	1%	3.41	4.68
		5%	2.62	3.79
		10%	2.26	3.35

Table 3 presents the estimated results of the long run coefficients of the ARDL model. The long run coefficients of financial development has a positive impact at 1% significant level on economic growth, which indicates that 1% increase in financial development boost economic growth by 0.4551%. The outcome of the study suggests that financial development plays a significant role in economic growth performance in the Nepalese economy. This result is consistent with those of Ang and Mckibbin (2007) for Malaysia; Uddin et al. (2013) for Kenya, and Sehrawat and Giri (2015) for India.

Regarding the control variables of the long-run coefficients of the ARDL model, the estimated long-run coefficient of investment is positive and statistically significant with economic growth in Nepal, which shows that a 1% increase in investment boost economic growth by 0.3963%. This study result is in line with the work of Seetanah (2008) for the case of small island state of Mauritius. Likewise, government expenditures has a positive influence on economic growth, suggesting that a 1% increase in government expenditures increase economic growth by 0.3344%. As expected, the estimated result of trade openness variable has a negative impact on economic growth, which implies that a 1% increase in trade openness decreases economic growth by 0.3629%. This result clearly shows that Nepal is an import dependent economy during the study period. This study outcome is in line with the prior work of Hye et al. (2014) who found a negative relationship between trade openness and economic growth in

Pakistan. Similarly, the estimated coefficient of inflation is negatively connected with economic growth, which indicates that a 1% increase in the inflation decline economic growth by 0.1541%. This study result is in line with the earlier work of Türsoy and Faisal (2018) for North Cyprus.

Table 3. Estimated Long Run Coefficients from ARDL Model

Dependent Variable: Y				
Variables	Coefficient	Standard error	*T*-ratio	Probability
lnFD	0.4551	0.0173	26.3728***	0.0000
lnTO	-0.3629	0.0609	-5.9586***	0.0003
lnGOV	0.3344	0.2629	1.2722	0.2390
lnINV	0.3963	0.1692	2.3419**	0.0473
lnINF	-0.1541	0.0355	-4.3414***	0.0025
C	4.5491	0.2938	15.4820***	0.0000

Note. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels of significance.

The estimated results of the short-run dynamic coefficients using the ECM version of ARDL model are reported in Table 4. The estimated short-run coefficient of financial development still has a positive impact on economic growth and statistically significant at the 10% level. The estimated coefficient of trade openness has a positive impact on economic growth in Nepal over the study period from 1979 to 2018. In contrast, the estimated short-run coefficient of the government expenditures, investment and inflation variables are negatively related with economic growth during the study period. Moreover, in Table 4, the ECM_{t-1} coefficient (-0.3708) is negative and highly statistically significant at 1% significant level, which corroborates the anticipated convergence process in the long-run dynamics. This implies that an ECM_{t-1} outcome support the long-run cointegration relationship among economic growth, financial development, trade openness, government expenditures, investment and inflation variables.

Table 4. Estimated Short Run Coefficients with ECM Results from ARDL Model

Dependent Variable: Y				
Variables	Coefficient	Standard error	*T*-ratio	Probability
ΔFD	0.0326	0.0170	1.9216*	0.0909
ΔTO	0.1992	0.0297	6.7034***	0.0002
ΔGOV	-0.0413	0.0319	-1.2948	0.2315
ΔINV	-0.0457	0.0275	-1.6620*	0.1351
ΔINF	-0.0157	0.0039	-4.0728***	0.0036
ECM_{t-1}	-0.3708	0.0566	-6.5453***	0.0002

Note. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels of significance.

The diagnostic tests outcomes of the ARDL model are presented in Table 5. The serial correlation LM test outcome confirms that there is no serial correlation and no evidence of the autoregressive conditional heteroskedasticity. The normality test outcome indicated that the residual terms are normally distributed and the Ramsey RESET test model is well specified in this study.

Table 5. Diagnostic Tests Results

Diagnostic tests			
R-squared	0.9348	Adjusted R-squared	0.7147
Serial correlation LM test	4.1488 (0.0985)	Normality test	0.5125 (0.7739)
Ramsey RESET	0.3242 (0.7514)	Heteroskedasticity test	0.1305 (0.7202)
CUSUM	Stable (5%)	CUSUMQ	Stable (5%)

Figures 2 and 3 show the plots of cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares recursive residuals (CUSUMQ) statistics in the study period from 1979 to 2018. The plots of the CUSUM and CUSUMSQ statistics lie within the critical bounds at the 5% level of significance, which confirm that all the estimated long-run coefficients are stable in Nepal during the sample period.

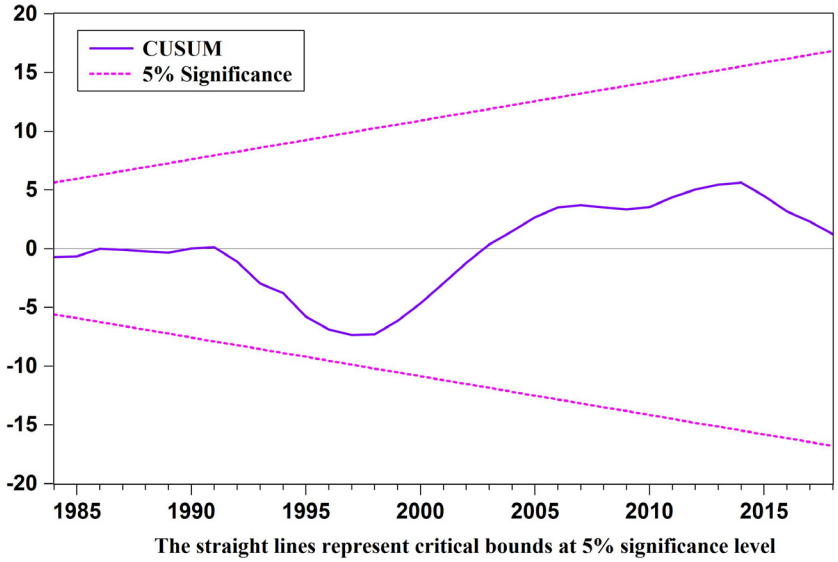

Figure 2. Plot of Cumulative Sum of Recursive Residuals

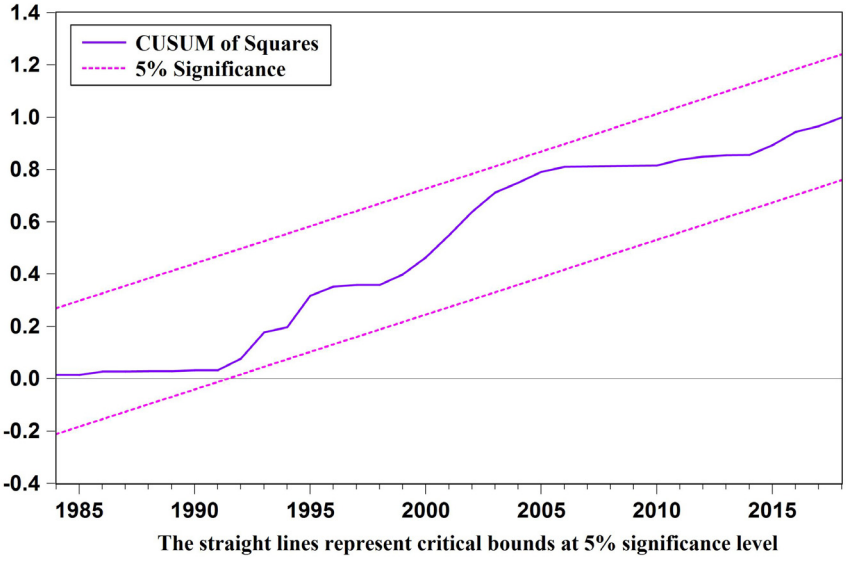

Figure 3. Plot of Cumulative Sum of Squares of Recursive Residuals

4. Conclusions

This study examined the relationship between financial development and economic growth in Nepal from 1979 to 2018 using the ARDL method with time series data framework. The study used the ADF and PP unit root tests to identify the order of integration of the variables and found that all the variables (economic growth, financial development, trade openness, government expenditure, investment, and inflation) are stationary as well as integrated of the first order process at the first difference. The bound test result confirms the cointegrating relationship among economic growth, financial development, trade openness, government expenditures, investment, and inflation variables during the study period. The empirical results of both in the long-run and short-run showed that financial development is positively related with economic growth in Nepal. However, this study found that inflation variable has a negative influence on economic growth. Interestingly enough, it is also found that trade openness variable has a negative influence on economic growth in the long run whereas it has a positive influence in the short run. In contrast, investment and government expenditures variables have positive influence on economic growth in the long run while they have negative influence on economic growth in the short run.

In sum, this study result clearly indicates that financial development has been a key driver and an important engine of growth performance in the Nepalese economy. In this regard, the study results suggest that the planners and policy makers should use financial development variable as an instrument for economic growth to promote sustainable development in the country. Moreover, the findings suggest that more finance might be better functioning economic growth in this country. This study only used one variable (domestic credit provided by banking sector as a percentage of GDP) of financial development. Future study can be expanded the multiple variables (i.e., ratio of broad money to GDP, ratio of liquid liabilities to GDP, and bank deposits to GDP of financial development by using a Principal Component Method (PCM) to generate a single indicator of financial development and examines the connection between economic growth and financial development for Nepal.

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