

The Impact of Financial Liberalization on National Economy of Nepal: An Application of ARDL Model

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Abstract

This paper studies the impact of financial liberalization on economic growth in Nepal. Based on the time series data sets of GDP, GCF and FLI over 46 years collected from Nepal Rastra Bank, Ministry of Finance, and the World Bank, the paper employed ARDL model and descriptive statistics method. The paper found the short-term relationship between financial liberalization and economic growth. The relationship is positive in all four financial reforms in the different periods. However, the relationship between financial reform and economic growth in 1990 and 2004 are ambiguous, despite their positive marginal effects. Similarly, financial liberalization index (FLI) and real interest have not significant and FLI has not positive impact on economic growth. The result is validated by expansionary descriptive statistics of number of financial institutions, growing credit investment, increasing ATM users and mobilization of resources in the economy. Therefore, the financial liberalization is a good driver having multiplier impact on economic growth but parameters of financial liberalization have not cascaded effects and automatic propelling effects on economic growth for predictable sustainable economic growth. Therefore, the slow and scattered propelling and cascading effects of parameters of financial liberalization are big challenges in Nepalese economy to minimize the risks of unpredictable uncertainty and instability in the banking sector. The results lead further sustainable, certain and predictable financial reforms for cascading and self-propelling effects on economic growth. Therefore, the government of Nepal should continue financial liberalization process for improving fair financial competition and credit investment on productive sectors for maintaining financial stability, economic growth and the welfare of the poor.

Keywords: Financial liberalization, financial reforms, economic growth, financial liberalization index, Nepalese context.

Introduction

Financial liberalization is aimed at the development of financial sector through deregulation in the various areas of the financial sector. Promoting foreign banks, the first impact of financial liberalization reduces interest rate and make competitive financial market and banking industry (Daniel & Jones, 2007). Increasing capital investment, they can finance big projects as required in the national development policy and plan. In the financial market, it escalates market competition (Hope *et al.*, 2013; Cubillas & González, 2014). As a cascading effect of low interest rate, the growth of savings and investments boosts up economic growth rate (Misati & Nyamongo, 2011). Besides, deregulation promotes capital formation (Shaw, 1973; Levine, 1997). Despite a small landlocked economy, Nepal opened financial market partially in the mid1980s and fully in the 1990s (Bista, 2016; Bista, 2021). As subsequences, significant numbers of private and foreign invested banks have enriched the banking industry in terms of domestic and foreign capital, brand, management, technological transfer and quality services.

All over the country have received multiple banking services. Out of 29 million populations, deposit accounts are 44.9 million and ATM cards are 10 million. The banks have mobilized 5400 billion rupees and financed 4900 billion rupees for different small and big projects across the country (NRB, 2022). Thus, financial liberalization has become a complementary to GDP growth in the last 39 years.

Recently, Nepal has given top priority on higher economic growth and higher total factor productivity friendly big projects for generating employment for reducing the challenge of poverty and inequality of the people because Nepal expects rapid and higher level of economic growth annually over 25 years to upgrade Nepal's least developing status to developing countries with the achievement of US\$ 12210 Gross Domestic Product (GDP) per capita (NPC, 2019). As the budget of Nepal has given top priority to big infrastructure national projects such as multimodal road project, big energy projects, and industrial and infrastructural development projects, a big finance is highly relevant (NPC, 2019). As a policy solution, NRB (2015) has adopted a merger and acquisition policy to increase paid up capital of all the commercial banks by four times in the monetary policy in 2015 in accordance with the merger by laws in 2011 for financial growth, stability, and sustainability. In 2022, the merger policy has made 26 commercial banks from 32 that of 2012. Despite increasing paid up capital, the banking industry has financial stress and instability because of low efficiency, under- and over-allocation of capital on non-priority sectors, increasing non-performing loan, high CCD ratio and liquidity crisis (NRB, 2022). In this situation, the relationship between financial liberalization and economic growth is a relevant issue.

The basic idea of financial liberalization is deregulation in financial market. This concept triggers financial development for expanding capital investment, productive economic activities in real sectors, employment creation and then boost up the performance and contribution of real sectors to GDP and GDP growth. This is a positive implication of financial liberalization but every reform has pros and cons.

Literature review

Yildirim, Ozdemir and Dogan (2013) studied cross country study on Financial Development and Economic Growth Nexus in Emerging European Economies: New Evidence from Asymmetric Causality studied in 10 countries including Bulgaria, Croatia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Turkey, and Ukraine. Time series data set was of 12 years from 1990 to 2012. The study found positive relationship between financial development and economic growth. Its limitation is not sufficient to draw a strong conclusion and argument. Despite aggregate nature of this issue, Moyo, Nandwa, Oduor and Simpasa (2014) employing primary data used probit/logit models as an alternative of unavailability of time series data. It raises a compatibility issue. Additionally, Joshi (2016) assessed this issue by using twenty years' time series data (1990 to 2013) including 3 variables (GDP per capita of India, broad money (M_2) - GDP ratio and capitalization of stock market to GDP ratio. The study has also issue of data set.

In Cameroon Agbor (2016) argued a strong positive correlation between financial sector development and economic growth in long run. It has not included bank interest rate, inflation rate etc. However, Malmbika and Mumangent (2016) examined the impacts of liberalization on economic growth in Zambia (1983- 2013). The study was in the perspective of an interest rate and capital formation. The study used time series data from 1983 to 2013. Its analytical tool was time series ARDL model. The study found negative and insignificant impact of financial liberalization on economic growth in short run. However, financial liberalization and growth have long run positive and insignificant relationship. Omolara & John (2016), assessed the impact of financial reforms on the output growth of the manufacturing sector in Nigeria. The study covered time series from 1986 to 2013. Its analytical model was descriptive statistics and vector autoregressive model (VAR). The result shows not impressive development of manufacturing sector under the reform.

Sanchez and Gori (2016) investigated the benefits of policy reforms on economic growth. The study covered cross-country of 100 developed and emerging economies. The study applied growth model to panel data from 1970 to 2010. the result shows financial liberalization's positive impact on economic growth. However, this paper has limited more on exchange rate and trade openness. Marrazzo and Terzi (2017) examined the short- and medium-term impact of these reforms on GDP growth, focusing on 23 wide-reaching structural reform packages (including both real and financial sector measures) rolled out in 22 countries between 1961 and 2000 by using synthetic control method (SCM). The paper found the positive impacts of financial reform on GDP per capita only after five years with roughly 6 percent growth of GDP per capita. In short term, reforms had a negative but statistically insignificant impact.

Nwaonuma and Udude (2017) aimed to estimate the causal relationship between financial development and economic growth in Nigeria covering time series data from 1970 to 2012 by using endogenous growth model-based time series econometrics method and Augmented Dickey-Fuller test statistics including financial development indicators and real GDP as economic growth. The empirical result shows evidence of unidirectional causality between economic growth and financial development. The relationship runs financial development to economic growth, along with their stable relationship in Nigeria. Similarly, Sanogo & Moussa (2017) investigated financial development and economic growth nexus in the Ivory Coast covering 60 years' time series data from 1961 to 2014. Employing endogenous growth model and vector autoregressive model (VAR), the study found synonymous between these two

terms in Ivory Coast. Their causal link was unidirectional. Additionally, examining the effect of financial and real estate growth on overall economic growth in sub-Saharan African countries, Ibrahim and Alagidede (2018) used panel data for 29 sub-Saharan African countries over the period 1980-2014. Using the system-generalized method of moments (GMM), the study found the positive contribution of financial and real sectors on economic growth and higher elasticity of growth to change in either the size of real sector or financial sector.

Similarly, the previous studies have similar results in Nepal. According to Kharel and Pokhrel (2012), banking sector is a key player playing in promoting economic growth, along with small size of capital and weak relationship with real economic activities. Joshi (2016) notes its fruitful investment and financial intermediation led virtuous cycle of higher savings, improved investment efficiency, and higher real economic growth over time. Empirically, Dhungana (2014), and Gautam (2015) found the positive relationship between financial development and economic growth in Nepal. Dhungana (2014) mentioned it in terms of long run but Gautam (2015) found in both long and short run. Regarding this, Bhetwal (2021) establishes the link between financial liberalization and economic growth arguing that an efficient financial system improves the efficiency of resource mobilization and allocation. The study found the presence of bi-directional causal relationship between the liberalization of financial sector and level of financial development in Nepal. However, these literatures have left a dimensional and methodological gap. In this situation, there is a research gap. Therefore, this study is highly relevant to fill up this gap. In this context, this study examines whether the impact of financial liberalization is positive on economic growth in Nepal or not. The output of the study would be a valuable input to the policy making and implication.

Objectives

This paper examines consistency of financial liberalization in Nepal and their effects on liberalization and performance of financial institution. Specific objectives are as follows: a) to examine the consistency of financial liberalization in Nepal, b) to evaluate the impact of financial liberalization and c) to explore issues and policy implications.

Methodology

Conceptual and Analytical Framework

WB (2016) and DFID (2004) argues that “economic growth is a function of financial development (FD)”. This positive relationship between economic growth and financial development encourages financial liberalization for financial development ultimately for economic growth. Let’s consider economic growth as output indicator to change in GDP (Δ GDP) and Financial Reform (FR) as policy intervention to Financial Development for improving efficiency of financial system and expanding its coverage and transaction turnover of financial intermediaries. Let us consider this financial reform drives financial development and financial development has created two effects: direct impacts of FD (DFD) and indirect impacts of FD (IDFD) on economic sector development and then economic growth. Liberalization of interest rate has direct effect on capital accumulation and capital investment on sector economics and their production and productivity and indirect effect on capital formation. Let’s suppose its ultimate contribution on economic growth. Therefore, financial development contributes economic growth of the economy.

Model

As mentioned in conceptual and analytical framework (WB, 2016 and DFID, 2004) and used by Bhetwal (2021), let’s suppose economic growth of any country (Δ GDP) as dependent variable and as independent variables: Direct FD (DFD) and Indirect FD (IDFD) and Financial Reform (FR). Mathematically, there is a functional relationship between economic growth (Δ GDP) and Direct FD (DFD) and Indirect FD (IDFD) and Financial Reform (FR). It can be expressed as follows:

$$\Delta GDP_i = f(DFD_i, IDFD_i, D_i) \dots \dots \dots (1)$$

As a proxy of direct effect of financial development and as a proxy of indirect effect of financial development, financial liberalization index (FLI) and gross capital formation (GCF) will be used respectively and financial reform-initiated date (year) will be captured in dummy variables. The mathematical function becomes as follows:

$$\Delta GDP_i = f(FLI_i, GCF_i, D(FR)_i) \dots \dots \dots (2)$$

Tools of data analysis

Unit root test

It is one of the pre-condition tests to run ARDL model about non-stationery and unit root test of time series data because the stationary of time series data is primarily needed. It is a tool to test whether the time series have a non-stationary with unit root test. In this test, augmented Dickey-Fuller (ADF) test is widely used. In the test, there are three levels: a) without trend, b) with trend, c) with drift to be integrated 0 order 1 denoted by I (1) in equation 3.

$$\text{Let us consider a model: } Y_t = \rho Y_{t-1} + U_t \quad -1 \leq \rho \leq 1 \dots\dots\dots(3)$$

Where U_t is the white noise error term. If ρ has the value of 1 then equation (1) becomes a random walk model without drift which is theoretically non-stationary. Subtracting Y_{t-1} from both sides in equation (3) we get,

$$Y_t - Y_{t-1} = \rho Y_{t-1} - Y_{t-1} + U_t$$

$$\text{or, } \Delta Y_t = \delta Y_{t-1} + U_t \dots\dots\dots(4)$$

where, Δ is the first difference operator, $\delta = \rho - 1$. For the unit root test, we estimate the equation (4) and test if $\delta = 0$. Because when $\delta = 0$, then $\rho = 1$ which means it has a unit root or the time series is non-stationary. For checking whether $\delta = 0$ or not, the usual t-test would not be appropriate.

The ADF test consists of estimating the following equation 5:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + U_t \dots\dots\dots(5)$$

If the null hypothesis of $\delta = 0$ is rejected, then we can say that the time series is stationary.

Optimal lag section method is another pre-condition to select optimal lag in ARDL model. In software, VAR model is used for Akaike Information criterion (AIC). On the basis of AIC, the optimal lag is selected in ARDL model.

ARDL model is an autoregressive distributed lag (ARDL) model tracing a dynamic relationship with time series data in a single equation framework. This is widely used for non-stationary and stationary time series (Pesharan, Shin & Smith, 2002).

Let's expand the equation (2) into econometric model in which let's suppose real GDP (Y_t) as the dependent variable with the independent variable such as financial liberalization index (FLI), gross fixed capital formation (GCF), real interest (RI) and Dummy (Liberalization Initiation) as follows.

$$Y_t = \beta_0 + \beta_1 (FLI) + \beta_2 (GCF_t) + \beta_3 (RI) + \beta_4 D_0 (Lib_{1980}) + \beta_5 D_1 (Lib_{1990}) + \beta_6 D_2 (Lib_{1999}) + \beta_7 D_3 (Lib_{2004}) + \varepsilon_t \dots\dots\dots(6)$$

Where,

FLI = Financial Liberalization Index

GCF_t =Gross Capital Formation over time

RI = Real Interest Rate

D_0 = 1=Liberalization in 1980s

0=others

D_1 = 1=Liberalization in 1990s

0=others

D_2 = 1=Liberalization in 1999

0=others

D_3 = 1=Liberalization in 2004

0=others

β_0 = the constant

β_1 =Coefficient term of Financial Liberalization Index

β_2 =Coefficient term of Gross Fixed Capital Formation (CGF)

β_3 =Coefficient term of RI

B_4 =Coefficient term of Dummy variable (D_0)

B_5 =Coefficient term of Dummy variable (D_1)

B_6 =Coefficient term of Dummy variable (D_2)

B_7 =Coefficient term of Dummy variable (D_3)

ε_t = the stochastic disturbance term (error term)

The error correction version of this equation is given by:

$$\Delta \ln RGDP_t = a_0 + \sum_{i=1}^p \beta_i \Delta \ln RGDP_{t-i} + \sum_{i=1}^p \delta_i \Delta \ln FLI_{t-i} + \sum_{i=1}^p \varepsilon_i \Delta \ln GCF_{t-i} + \sum_{i=1}^p \Omega_i \Delta \ln RI_{t-i} + \sum_{i=1}^p \theta_i \Delta \ln Lib_{t-i} + \lambda_1 \ln RGDP_{t-1} + \lambda_2 \ln FLI_{t-1} + \lambda_3 \ln GCF_{t-1} + \lambda_4 \ln RI_{t-1} + \lambda_5 \ln Lib_{t-1} + \mu_t \dots \dots \dots (7)$$

The coefficients α , β , δ , ε , Ω , and μ represent the short-run coefficients of the model in equation 7 whereas the λ s represent the long-run coefficient. Hence, the ARDL model captures the short-run and long-run relationship simultaneously. The ARDL model also solves the problem of autocorrelation and endogeneity.

Software for data analysis

To analyze the data, computer packages Microsoft Excel and E-views are used.

Data sources and nature

Data to analyze financial sectors and financial reforms in Nepal will be secondary nature. Secondary data for GDP, DFD and IDFD that will be time series will be collected from Nepal Rastra Bank and Economic Survey and Bank publications. The time series data will be employed from 1975 to 2021

Findings and discussions

Unit Root Test: Result of Augmented Dicky-Fuller Test

This study has undertaken time series data of RGDP, GCE, FLI and RI from 1975 to 2021. Since time series data are non-stationary nature with unit roots, these four variables raise a query whether they have unit root. Therefore, the study used Augmented Dicky Fuller (ADF) test to find out whether these times series are non-stationary including inconsistent mean, variance and co-variance. The result of ADF is presented in detail below.

Table 1: Result of Augmented Dicky-Fuller Test: Stationary or Non-Stationary

S N	Variable	Included in test equation:	t-statistics	p-value*	Critical Values			Order of Integration
					1%	5%	10%	
1	Ln RGDP	Intercept and trend	-2.796	0.0000	-4.187	-3.516	-3.190	I(0)
2	Ln RGDP	Intercept and drift	0.164	0.0000	-2.416	-1.681	-1.302	I(0)
3	In GCE	Intercept and trend	-1.541	0.0000	-4.187	-3.516	-3.190	I(0)
4	In GCE	Intercept and drift	-1.439	0.0000	-2.416	-1.681	-1.302	I(0)
5	FLI	Intercept and trend	-1.541	0.0000	-4.187	-3.516	-3.190	I(0)
6	FLI	Intercept and drift	-0.835	0.0009	-2.416	-1.681	-1.330	I(0)
7	RI	Intercept and trend	-5.958	0.000	-2.626	-1.950	-1.608	I(0)
8	RI	Intercept and drift	-6.644	0.0000	-4.187	-3.516	-3.190	I(0)

Data source: NRB

Table 1 shows the result of ADF unit root test on four variables: lnRGP, lnGCE, FLI and RI in which the study tested a null hypothesis: the variable is under unit root. Alternative hypothesis: the variable is not under unit root. Above table shows ADF test results in which p-values of lnRGDP, lnGCE, FLI and RI variables are less than their critical values at 5 percent. It implies these variables have not unit root. It means all variables are stationary. Therefore, null hypothesis is rejected.

Optimal Lag Length Selection

Optimal Lag length selection is a big issue for ARDL model because of autoregressive element. For this objective, there are five criteria: a) LR: sequential modified LR test statistics, b) FPE: Final Prediction Error, c) AIC: Akaike Information criterion, d) SC: Schwarz Information criterion, and e) HQ: Hannan-Quinn information criterion. This study used AIC criteria to select optimal lag length.

This study examines what is lag length of AIC criteria. Table 2 presents the result of ARDL's lag order selection criteria.

Table 2: Result of VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria						
Endogenous variables: LN_RGDP LN_GCF FLI						
Exogenous variables: C						
Date: 03/29/23 Time: 17:48						
Sample: 1975 2021						
Included observations: 43						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	38.23328	NA	3.90e-05	-1.638757	-1.515883	-1.593445
1	210.3480	312.2081*	1.98e-08*	-9.225489*	-8.733991*	-9.044240*
2	213.6856	5.588469	2.60e-08	-8.962120	-8.101999	-8.644934
3	219.4397	8.831983	3.07e-08	-8.811151	-7.582407	-8.358028
4	228.3949	12.49559	3.18e-08	-8.809066	-7.211698	-8.220006
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Table 2 shows the result of VAR lag order selection. In the result, the result of AIC: Akaike Information criterion indicates 1 as the optimal lag length for ARDL model. In the ARDL, lag length would be at least 1.

Descriptive Statistics of the model

In ARDL model, lnRGDP is dependent variable and lnGCF, FLI, RI, Date1984, Date1990, Date1999 and Date2004 are independent variables. In the model, there are four non-categorical variables (lnRGP, lnGCF RI and FLI) four categorical variables (Date0 1980s, Date1 1990s, Date2 1999s, and Date3 2004s). In the descriptive statistics, mean, median, maximum, minimum, standard deviation and observations were used to describe above eight variables of the ARDL model. Its descriptive statistics is presented in table below.

Table 3: Descriptive Statistics of ARDL Model

	LN_RGDP	LN_GCF	FLI	RI	D ₀ 1984	D ₁ 1990	D ₂ 1999	D ₃ 2004
Mean	13.70	11.17	0.44	-0.43	0.80	0.63	0.48	0.36
Median	13.73	11.30	0.59	-0.2	1.00	1.00	0.00	0.00
Maximum	14.68	14.28	0.86	13.38	1.00	1.00	1.00	1.00
Minimum	12.76	7.91	0.00	-10.12	0.00	0.00	0.00	0.00
Std. Dev.	0.59	1.95	0.31	4.21	0.39	0.48	0.50	0.48
Observations	47	47	47	47	47	47	47	47

Table 3 shows descriptive statistics of eight variables in which mean of lnRGDP is 13.70. It is followed by 11.17 mean of lnGCF, 0.44 mean of FLI, -0.43 mean of RI, 0.80 D₀(1984), 0.63 D₁(1990), 0.48 Date D₂(1999) and 0.36 D₃(2004). In the data sets, standard deviation and gap between maximum and minimum are not significant.

Result of ARDL Model

Major shocks of economic reform in Nepal are four different consecutive periods: date 1: the financial reform in 1984 (D₀(1984)), date 2: the financial reform in 1990s (date₁(1990s)), date 3: the financial reform in 1999s (date₂(1999)), and date4: the financial reform in 2004 (date₃(2004)). These reforms were as a conditional prescription of IMF and World Bank to development assistance to Nepal, when macro-economic crisis happened in 1980s. The government of Nepal has claimed their positive impacts on economic growth and welfare of the people. Similarly, there is assumption of positive relationship between these reforms and economic growth. These claims and assumptions have not strong empirical evidences.

In this context, this study is relevant. The study has tested the assumption over 46 years' period (1975-2021), including gross capital formation (GCF), financial liberalization index (FLI), real Interest rate (RI) and categorical variables: D_0 (1984), $date_1$ (1990s) and $date_2$ (1999) and $date_3$ (2004). The ARDL model is used to trap short run and long run impact of financial liberalization on GDP. Its result is presented in table below.

Table 4: Result of ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LN_RGDP (-1)	0.529013	0.076159	6.946169	0.0000
LN_GCF	0.138772	0.022070	6.287820	0.0000
FLI	-0.004017	0.083868	-0.047892	0.9621
FLI (-1)	0.083376	0.065673	1.269554	0.2140
RINTEREST	0.000670	0.000867	0.772760	0.4457
D1984	0.081636	0.032107	2.542598	0.0164
D1984(-1)	-0.086311	0.033210	-2.598904	0.0144
DATE1990	0.061418	0.038283	1.604309	0.1191
DATE1990(-1)	-0.108100	0.041774	-2.587741	0.0147
DATE1999	0.099359	0.043963	2.260055	0.0312
DATE1999(-1)	-0.110221	0.046366	-2.377220	0.0240
DATE2004	0.088826	0.049196	1.805539	0.0810
DATE2004(-1)	-0.116586	0.051298	-2.272718	0.0304
SHOCK1	0.018810	0.019803	0.949844	0.3498
SHOCK1(-1)	-0.046270	0.025557	-1.810480	0.0802
C	4.909889	0.819729	5.989649	0.0000
R-squared	0.999396	Mean dependent var		13.72651
Adjusted R-squared	0.999094	S.D. dependent var		0.587957
S.E. of regression	0.017698	Akaike info criterion		-4.962513
Sum squared resid	0.009397	Schwarz criterion		-4.326464
Log likelihood	130.1378	Hannan-Quinn criter.		-4.724245
F-statistic	3309.010	Durbin-Watson stat		2.522271
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Table 4 reveals the estimation result of ARDL model. The table shows all fifteen coefficients of $\ln RGDP_{-1}$, $\ln GCF$, FLI , FLI_{-1} , Shock (policy), Shock (policy) $_{-1}$, RInterest rate (RIR), and categorical variables: D_0 (1984), $date_1$ (1990s), $date_2$ (1999) and $date_3$ (2004) and their lags D_0 (1984) $_{-1}$, $date_1$ (1990s) $_{-1}$, $date_2$ (1999) $_{-1}$ and $date_3$ (2004) $_{-1}$. In the fifteen coefficients, five coefficients are dynamics and ten coefficients are categorically fixed. Since the estimated p-value of dynamic variables: gross fixed capital (GCF), and $RGDP_{-1}$ are significant at 5 percent critical value, the relationship between real GDP, gross fixed capital (GCF), and real GDP difference (1) is positive. However, the estimated p-value of FLI , FLI_{-1} , Shock (policy), Shock (policy) $_{-1}$, RInterest rate (RI) are insignificant at 5 percent critical value, their relationship is ambiguous. Furthermore, the marginal coefficient of FLI and Shock (policy) $_{-1}$ are negative but of FLI_{-1} , Shock (policy), and RInterest rate (RI) are positive sign. Thus, the positive relationship between $RGDP$ and GCF reveals that the impact of financial liberalization is positive on GCF and the growth of GCF has positive impact on $RGDP$.

Similarly, the categorical variables refer four financial reforms in four time periods (1984, 1990, 1999 and 2004). These dummy variables examine the impact of financial liberalization on GDP. Since in the result of ARDL model, the estimated p-values of date1: financial reform in 1984 ($D_{0(1984)}$), date 2: financial reform in 1990 ($date_{1(1990)}$), date 3: financial reform in 1999 ($date_{2(1999)}$) and date 4: financial reform in 2004 ($date_{3(2004)}$) and their lags $D_{0(1984)-1}$, $date_{1(1990s)-1}$, $date_{2(1999)-1}$ and $date_{3(2004)-1}$ are significant at 5 percent critical value, except financial reform as $date_{1(1990)}$ and $date_{3(2004)}$, the relationship between all financial reforms and GDP are positive, except their lag values. Furthermore, financial reform in 1984 and in 1999 have positive impact on GDP but the impact of financial reform in 1990 and 2004 are ambiguous. Thus, we can conclude financial liberalization has positive impact on GCF and then GDP more in 1984 and 1999 than that of 1990 and 2004.

Serial Correlation Test

Breusch-Godfrey Serial Correlation LM test is run to verify whether the residuals from the model are serially uncorrelated and select the number of lags. Null hypothesis is that the residuals are serially uncorrelated. Alternative hypothesis is that the residuals are serially correlated. Its result is presented in table.

Table 5: Result of LM Test

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.914952	Prob. F (1,36)	0.3452
Obs*R-squared	1.140129	Prob. Chi-Square (1)	0.2856

Table 5 shows the estimated value of F-statistics p value that is 0.34. Since it is higher than p-value at 5 percent critical value, we will fail to reject the null hypothesis is that the residuals are serially uncorrelated. We therefore conclude that the residuals are serially uncorrelated.

Residual Diagnostics/Heteroscedasticity Tests

Breusch-Godfrey Serial Correlation LM test is used to verify whether the residuals from the model are heteroscedasticity and select the number of lags. Null hypothesis is that the residuals are not heteroscedasticity. Alternative hypothesis is that the residuals are heteroscedasticity. Its result is presented in table.

Table 6: Result of Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.924882	Prob. F (8,37)	0.0853
Obs*R-squared	13.51850	Prob. Chi-Square (8)	0.0952
Scaled explained SS.	14.94390	Prob. Chi-Square (8)	0.0602

Above table 6 gives the estimated value of F-statistics p-value that is 0.08. Since it is higher than p-value at 5 percent critical value, we will fail to reject the null hypothesis is that the residuals are not heteroscedasticity. We therefore conclude that the residuals are not heteroscedasticity.

Co-integration Test /Bound Test

ARDL Bounds test is run to test for the presence of co-integration. To test it, view/coefficient diagnostics/long run form and bounds test is proceeded. Its result is presented in table 7 below.

Above table 7 shows a result of ARDL bound test. In the result of ARDL bound test, value of F-statistics is 6.25 greater than the lower bound I (0) and upper bound I (1) at 5% critical value bounds. It indicates this series having a co-integration long run relationship.

Table 7: Result of ARDL Bound Test

ADRL Bounds Test		
Date:03/30/23 Time: 19:30		
Sample: 2 47		
Included Observations: 46		
Null Hypothesis: No long-run relationship exists		
Test Statistic	Value	k
F-statistic	6.256904	3
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
10%	2.37	3.20
5%	2.79	3.67
2.5% . 1	3.15	4.08
1%	3.65	4.66

Discussion

The study examines the assumption of the positive relationship between financial reform and economic growth but differently by using 47 years long time series data and different variables (GCF, and FLI (financial liberalization index) and different financial reform time zones. The result of ARDL model includes all fifteen coefficients of \ln RGDP (-1), \ln GCF, FLI, RI, shocks, date 1: financial reform in 1984, date 2: financial reform in 1990, date 3: financial reform in 1999 and date 4: financial reforms in 2004. In the model, FLI represents 47 years long single financial liberalization with a quantitative value and rank. Four reforms are captured into four dummy variables in four different financial reforms of the government. In the fifteen coefficients, five coefficients are dynamics and ten coefficients are categorically fixed.

The result of ARDL model concerns with the relationship between financial reforms and real GDP. In the result, financial reforms in 1984 and 1999 are significant and positive to real GDP. Except the financial reforms in 1990 and 2004, the lag years in 1984, 1990, 1999 and 2004 are not positive. We can conclude the impact of financial reform are effective to positive change of real GDP, although financial reforms in 1990 and 2004 are slightly ambiguous. Further, we can conclude financial liberalization has positive impact on GCF and then GDP more in 1984 and 1999 than that of 1990 and 2004.

Similarly, expanding credit investment of the financial sectors, the financial liberalization triggers gross capital formation (GCF) of the economy and then push up real GDP. In the result of ARDL model, the relationship between real GDP and gross fixed capital (GCF) and the relationship between real GDP and real GDP₋₁ are significant and positive but FLI, FLI₋₁, Shock (policy), Shock (policy)₋₁, RInterest rate (RI) are insignificant and ambiguous. Although, the marginal coefficient of FLI and Shock (policy)₋₁ are negative but of FLI₋₁, Shock (policy), and RInterest rate (RI) are positive sign. Therefore, we can conclude that financial liberalization has a positive impact on GCF and then real GDP. From these two results, we can conclude that financial liberalization has positive impact on economic growth in short term.

This result is naturally validated. It is not different with the existing literatures. Except few literatures, international and national literatures have established that financial liberalization and economic growth have a positive relationship. Studies including Omolara & John (2016), Sanchez and Gori (2016), Bongini, et al. (2017), Adeleye, et al. (2017), Marrazzo and Terzi (2017), Nwaonuma & Udude (2017), Sanogo & Moussa (2017) and Ibrahim and Alagidede (2018) have validated it. However, it is different with the result of Malmbika and Mumangent (2016). The study argued negative and insignificant impact of financial liberalization on economic growth in short run. However, financial liberalization and growth have long run positive and insignificant relationship.

Besides, the existing national literatures, Kharel and Pokhrel (2012), Dhungana (2014), Gautam (2015) and Luintel, Selim and Bajracharya (2017) have a similar result. Therefore, the result has validated it.

Conclusion

This paper examines the impact of financial liberalization on economic growth in Nepal. Nepal has continuously adopted financial reforms to liberalize financial sector. There are four financial reforms in date 1: financial reform in 1980s, data 2: financial reform in 1990s, date 3: financial reform in 1999s and date 4: financial reforms in 2004. It has increased number of banks, development banks and financial institutions. Number of banks are 26 in 2022 even after merger and acquisition.

Out of 29 million populations, deposit accounts are 44.9 million and ATM cards are 10 million. The banks have mobilized 5400 billion rupees and financed 4900 billion rupees. Thus, financial liberalization is consistently continuous and well committed. Secondly, the financial liberalization has a positive impact on number of banks, credit investment, and saving and further on economic growth. Thus, the relationship between financial liberalization and economic growth is positive and significant. Therefore, the financial liberalization is a good driver having multiplier impact on economic growth but parameters of financial liberalization and higher economic growth have not cascaded effects and automatic propelling effects on economic growth for predictable sustainable economic development. Therefore, the slow and scattered propelling and cascading effects of parameters of financial liberalization are big challenges in Nepalese economy to minimize the risks of unpredictable uncertainty and instability in the banking sector. The result further suggests sustainable, certain and predictable financial reforms for cascading and self-propelling effects on economic growth. Therefore, the government of Nepal should continue financial liberalization process for improving fair financial competition and credit investment on productive sectors for maintaining financial stability, economic growth and the welfare of the poor.

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