

# Financial Services System Development and Economic Growth: Evidence from Nepal

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## **Abstract:**

*The present study intends to estimate the impact of the development of financial services system on Nepal's economic growth employing simple Ordinary Least Square technique on annual data from 1975 to 2011 regarding three proxies of financial development indicators and control variables for the robustness of the result. The bidirectional relationship between rate of growth of per-capita GDP and ratio of broad money to nominal GDP was analyzed through Granger Causality Test. The results showed that not all the measures of financial development indicators affect the economic growth. However, in the one lag form Liquid Liabilities of financial system to nominal GDP showed positive and significant impact on growth. As shown by the final equation, 1 percent increment in liquid liability to nominal GDP ratio would increase per-capita GDP by 0.15 percent by the next period. Among the control variables, the economic liberalization in terms of increasing volume of trade showed positive and significant impact on growth. The*

*significant result of dummy also showed spurted Nepal's position in economic liberalization from 1992 whereas the nation's population growth has hindered it during the study period. The Granger Causality Test revealed that there was unidirectional causality from first difference of liquid liabilities to growth and supported the result from regression equation.*

## **Keywords:**

Economic Growth, Financial Services System, Granger Causality Test, Nepal, Ordinary Least Square.

## **Introduction**

Financial and economic activities are interrelated and the notion is not new but has a long tradition in the economic theory. Clement Juglar [1], the French economist argued back in 1860s that economic fluctuation originates in the credit system. The growth of financial services sector is

theoretically important for a nation's economic growth and development. In so far as financial developments influence the long term output and employment growth, they can affect the wide range of indicators and tools that central system use to monitor and model the behavior of the economy. A seminal work in finance-growth nexus dates back to 135 years. The level of financial development is a good predictor of future rates of economic growth, capital accumulation and technological change [2]. [3] Studied the finance-growth relationship for 77 countries over the period 1960-1989 and conclude that the level of country's financial development helps predict the nation's rate of long-term economic growth. Some of the more cited works in favor of positive impacts of financial intermediaries are those by [4, 5, 6, and 7]. More recently [8] using simple Ordinary Least Square techniques and then examining robustness of the results by utilizing control variables found that the stock market development showed strong growth enhancing effect.

Nepalese banking system has now a wide geographic reach and institutional diversification. By the end of Mid-July 2012, altogether 265 banks and non-banks licensed by NRB are in operation. Among

this number 32 are commercial banks, 88 are developments banks, 69 are finance companies, 24 are micro-finance development banks, 16 are saving and credit cooperatives and 36 are NGOs. The figures on the financial services system reflect the numerical growth of the domestic financial services sector in which commercial banks held dominant share on the major balance sheet components of financial system [9]. This type of financial expansion is considered to be helpful in achieving the higher rate of growth and alleviating poverty. With simple bi-variate analysis of four proxies of growth and four proxies of financial development indicators [10] studied financial system and economic development with the sample from 1975 to 2004 in case of Nepal. All of the estimation results showed positive and almost significant impact of financial development (FD) indicators to economic growth indicators. However, these results were based on simple bi-variate analysis with FD indicators rarely found in literature. The causal relationship between economic liberalization and financial development was examined by [11] by constructing indices of financial liberalization and financial development using principle-component

method. Utilizing 30 sample observations over the period from 1975 to 2006, the author found the bi-directional causality between the indices of economic liberalization and financial development in case of Nepal using Granger Causality test and conclude that these variables had a significant contribution in accelerating economic growth.

Given the extensive work being conducted on the finance-growth relationship, this study attempts to contribute the literature

## Materials and Methods

Secondary annual data of the variables from 1975 to 2011 were used in the study to assess the impact of financial development on economic growth of Nepal. This study adopted the empirical methodology of Tang (2006) and more specifically uses Ordinary Least Square (OLS) technique of estimation with dependent variable as economic growth and Financial Development indicators (FD) as an independent variable. However, notwithstanding the fact that growth is also affected by number of other nonfinancial factors such as labor and capital productivity, trade, political stability etc, the study also introduces a number of control variables (CV) into the study framework.

yielding country-specific findings. The objective of the study therefore was - To evaluate the impact of the growth of the financial services system on economic growth of Nepal. However, more specifically the present study confines the proxy of financial development to that of statistics of commercial banks only, because of the dominance of commercial banks in the economy in terms of assets, deposits and credit.

Inclusion of these variables helps control for variability. Variables and the data sources used in the present study are shown in the Table 1.

**Dependent Variable:** Economic growth is measured by per-capita growth of real GDP at factor cost and is denoted by Growth. For the purpose of growth data on population and real GDP at factor cost were obtained from World Bank, Central Bureau of Statistics (CBS), Nepal and various issues of Economic Survey published by Ministry of Finance, Nepal.

**Independent Variables:** Since this study examines the relationship of financial development on economic growth,

independent variables as the three proxies of financial development (FD) indicators are used as describe in the Table 1 below.

Control Variables: The study follows Tang (2006) for the set of following control variables used in this study.

**Table 1: Summary List of the Estimating Variables**

Variables		Definitions	Sources
Independent	<b>LiLi</b>	Ratio of Broad Money ( $M_2$ ) to nominal GDP	CBS and Quarterly Economic Bulletin (QEB) of NRB
	<b>CoBa</b>	Ratio of financial system (FS) asset to the total assets (Assets of FS + NRB's Assets)	QEB of NRB
	<b>BaCre</b>	Ratio of total credits by financial system to nominal GDP	CBS and QEB of NRB
Control	<b>Trade</b>	Total merchandise trade to nominal GDP	QEB of NRB
	<b>GovCaEx</b>	Government capital expenditure to nominal GDP	Economic Survey, Ministry of Finance (MOF)
	<b>Invest</b>	Private sector gross fixed capital formation to nominal GDP	Economic Survey, MOF
	<b>PopGrow</b>	Population growth rate	World Bank and CBS

Based on the above-mentioned variables, the equations are estimated in two sets. All the above-mentioned variables (except Growth and PopGrow) are taken into natural logarithm form while estimating the equations.

**Equations under Set I:** This set contains Growth as dependent variable and only FD indicators as independent variables. Altogether fifteen equations with different combinations of regressors are used in this set and divided as; i) contemporaneous FD

indicators, ii) contemporaneous with lagged<sup>1</sup> FD indicators and iii) lagged FD indicators which are given as:

<sup>1</sup>The inclusion of the lag variables in this estimation is consistent with earlier domestic studies.

**Estimation with Contemporaneous FD Indicators**

$$\text{Growth} = a + b_1 \text{LiLi} + b_2 \text{CoBa} + b_3 \text{BaCre} \dots \dots \dots (1)$$

$$\text{Growth} = a + b_1 \text{LiLi} + b_2 \text{CoBa} \dots \dots \dots (2)$$

$$\text{Growth} = a + b_1 \text{LiLi} + b_2 \text{BaCre} \dots \dots \dots (3)$$

$$\text{Growth} = a + b_1 \text{CoBa} + b_2 \text{BaCre} \dots \dots \dots (4)$$

**Estimation with Contemporaneous and Lagged FD Indicators**

$$\text{Growth} = a + b_1 \text{LiLi} + b_2 \text{CoBa} + b_3 \text{BaCre} + b_4 \text{LiLi}_{-1} + b_5 \text{CoBa}_{-1} + b_6 \text{BaCre}_{-1} \dots \dots \dots (5)$$

$$\text{Growth} = a + b_1 \text{LiLi} + b_2 \text{CoBa} + b_3 \text{LiLi}_{-1} + b_4 \text{CoBa}_{-1} \dots \dots \dots (6)$$

$$\text{Growth} = a + b_1 \text{LiLi} + b_2 \text{BaCre} + b_3 \text{LiLi}_{-1} + b_4 \text{BaCre}_{-1} \dots \dots \dots (7)$$

$$\text{Growth} = a + b_1 \text{CoBa} + b_2 \text{BaCre} + b_3 \text{CoBa}_{-1} + b_4 \text{BaCre}_{-1} \dots \dots \dots (8)$$

**Estimation with Lagged FD Indicators**

$$\text{Growth} = a + b_1 \text{LiLi}_{-1} + b_2 \text{CoBa}_{-1} + b_3 \text{BaCre}_{-1} \dots \dots \dots (9)$$

$$\text{Growth} = a + b_1 \text{LiLi}_{-1} + b_2 \text{CoBa}_{-1} \dots \dots \dots (10)$$

$$\text{Growth} = a + b_1 \text{LiLi}_{-1} + b_2 \text{BaCre}_{-1} \dots \dots \dots (11)$$

$$\text{Growth} = a + b_1 \text{CoBa}_{-1} + b_2 \text{BaCre}_{-1} \dots \dots \dots (12)$$

$$\text{Growth} = a + b_1 \text{LiLi} + b_2 \text{LiLi}_{-1} \dots \dots \dots (13)$$

$$\text{Growth} = a + b_1 \text{CoBa} + b_2 \text{CoBa}_{-1} \dots \dots \dots (14)$$

$$\text{Growth} = a + b_1 \text{BaCre} + b_2 \text{BaCre}_{-1} \dots \dots \dots (15)$$

**Equations under Set II:** This set utilizes control variables (CV) along with significant FD indicators which will come from estimation of set I and dummy D1991 as:

$$\text{Growth} = a + b_1 \text{FD} + b_2 \text{Trade} + b_3 \text{GovCaEx} + b_4 \text{Invest} + b_5 \text{PopGrow} + b_6 \text{D1991} \dots \dots \dots (16)$$

Seven separate equations are estimated in this set and are sequentially carried out as; a) putting together all CVs and identified FD (as in equation 16), b) using all possible

pair-wise combinations of CVs with significant FD indicators found in set I (equations 17-22). The criteria for the robustness of the model are then judged by the improvement of model in terms of adjusted R<sup>2</sup> and Darwin-Watson statistic.

**Results and Discussion**

**Graph and Summary Statistics**

The graphs of the raw variables are provided in the Annexure 1. The graphs showed that

all of three measures of FD indicators possess an increasing trend with the slope being much steeper from 1992 onward. This may be due to the introduction of economic liberalization policies of the democratic government formed after the restoration of the multiparty system in 1992 justifying the inclusion of dummy variable as D1991 in the estimating equations.

The summary statistics consisting of arithmetic mean and standard deviations of all the variables are shown in the Table 2. The statistics are provided by breaking the whole period into two sub-periods as 1975-1991 and 1992-2011. The first sub-period provides the picture before Nepal entered into the economic liberalization period<sup>2</sup>; the second sub-period stands for the period after the democratic government was formed and the nation introduced liberalized economic policies. The average annual rate of per capita growth (Growth) over the total study period is 1.79 percent. However, the rate of growth is not found to be time invariant i.e. it remained more or less the same before and

<sup>2</sup>Although economic liberalization process in Nepal started during mid-1980s, the effective liberalization that the country saw was only after the political movement of early 1990s that established democratic government in 1992.

after the economic liberalization process. However the standard deviations of these mean growth shows that before the 1991 such rate had more deviation (0.034) from the mean growth rate compared to that after the liberalization period (0.015). On the other hand all of the financial development indicators show that there was less than average value of such measures before the liberalization period and more than average values after the liberalization period. More interestingly, unlike that for per-capita growth, these indicators in general were less volatile before 1991 compared to those after 1992.

**Table 2: Summary Statistics: Divided into Two Time-Segments**

Periods	Mean	Std. Dev	Obs.
<b>Measures</b>	<b>1975-2011</b>		
<b>Growth</b>	0.0179	0.0251	36
	<b>1976-1991</b>		
	0.0168	0.0342	16
	<b>1992-2011</b>		
	0.0189	0.0154	20
<b>Financial Development (FD) Indicators</b>			
<b>LiLi</b>	<b>1975-2011</b>		
	0.3728	0.1339	37
	<b>1976-1991</b>		
	0.2517	0.0586	17
	<b>1992-2011</b>		

	0.4758	0.0824	20
<b>CoBa</b>	<b>1975-2011</b>		
	0.6011	0.0848	37
	<b>1976-1991</b>		
	0.5255	0.0323	17
	<b>1992-2011</b>		
	0.6655	0.0574	20
<b>BaCre</b>	<b>1975-2011</b>		
	0.2179	0.1152	37
	<b>1976-1991</b>		
	0.1147	0.0275	17
	<b>1992-2011</b>		
	0.3057	0.0829	20
<b>Control Variables (CV)</b>			
<b>Trade</b>	<b>1975-2011</b>		
	0.3051	0.0851	37
	<b>1976-1991</b>		
	0.2189	0.0271	17
	<b>1992-2011</b>		

	0.3784	0.0286	20
<b>GovCaEx</b>	<b>1975-2011</b>		
	0.0936	0.032	37
	<b>1976-1991</b>		
	0.1145	0.0264	17
	<b>1992-2011</b>		
	0.0759	0.0253	20
<b>Invest</b>	<b>1975-2011</b>		
	0.1714	0.0266	37
	<b>1976-1991</b>		
	0.1531	0.0162	17
	<b>1992-2011</b>		
	0.1871	0.0237	20
<b>PopGrow</b>	<b>1975-2011</b>		
	0.023	0.0026	36
	<b>1976-1991</b>		
	0.023	0.0007	16
	<b>1992-2011</b>		
	0.023	0.0034	20

### Results under Set I

The results of equations under Set-I are provided below in the Table 3. In that table, the equations with variables those are statistically non-significant up to 10 percent level of significance are noted by hatch tag (#). The table showed that all the equations using only the contemporaneous (equations 1-4) variables of FD were non-significant even at 10 percent level of significance. However, LiLi at first lag level was found to

be significant in most of the equations having FD variables at both contemporaneous and lagged level. But remaining indicators, namely CoBa and BaCre were found to be statistically non-significant in almost all of the equations. The only equation found to be significant was 13 and empirically shown as:

$$\text{Growth} = 0.0197 - 0.135^* \text{LiLi} + 0.131^* \text{LiLi}_{-1} \quad (\text{Eqn.13})$$

(0.109) (0.024) (0.017)

**Adjusted R<sup>2</sup> = 0.113**

\* indicates significant at 5 percent level of significance. The value in the parenthesis indicates p-value.

Based on above estimation results, it is concluded that although the explanatory power is not very strong, LiLi as a FD

indicator at its level and lagged level was found to be significant and therefore carried out for further analysis in the equations under Set II.

**Table 3: Regression Results of Estimating Equations (Set-I)**

Eqn No.	Constant	FDs Contemporaneous			FDs Lagged			Adj R <sup>2</sup>	DW
		LiLi	CoBa	BaCre	LiLi <sub>1</sub>	CoBa <sub>1</sub>	BaCre <sub>1</sub>		
1		#	#	#					
2		#	#						
3		#		#					
4			#	#					
5	-0.0107	-0.071	-0.124	-0.033	0.135*	-0.1	0.041	0.088	2.34
6	-0.0079	-0.092	-0.118		0.153*	-0.066		0.126	2.27
7	-0.1926	-0.06		-0.015	0.557*		-0.378	0.063	2.17
9	-0.0061				0.087**	-0.2	-0.007	0.046	2.49
10	-0.0074				0.083**	-0.218		0.074	2.5
13	<b>0.0197</b>	<b>-0.135*</b>			<b>0.131*</b>			<b>0.113</b>	<b>2.05</b>
14			#			#			
15				#			#		

# indicates non-significant equations at even 10 percent level of significance.

**Results under Set II**

The results from equations under Set I provided LiLi and LiLi<sub>1</sub> as the Financial Development indicator. With these variables and the vector of Control Variables (CVs) along with dummy D1991, seven separate equations were estimated in this set and were sequentially carried out as a) putting

together all CVs along with identified FD indicator (equation 16) and b) using all possible pair-wise combinations of CVs with significant FD indicator found in set I (equation 17 to 22). The results are presented in the following table 4. As seen from the table, LiLi was significant both in contemporaneous and lagged form in



equation 16. Therefore, equation 17 to 22 (Table 4) were estimated using all six pairwise combinations of CV indicators with FD indicators being LiLi and LiLi<sub>-1</sub>. In all of these equations, LiLi and LiLi<sub>-1</sub> were found to be statistically significant at 5 and 10 percent of level of significance.

Also, among the control variables, Trade and PopGrow were found to be significant in each equation where they appear together. Therefore, from the process of iteration and method of elimination, the most representative equation under this set of equations was equation 19 and empirically given as:

**Growth**

$$= 0.0197 - 0.19LiLi^* + 0.15LiLi^* + 0.12Trade^{**} - 0.41PopGrow^{**} + 0.04D1991^{**}$$

**P-value (F-stat) = 0.066, Adj R<sup>2</sup> = 0.159**

**DW = 2.16..... (Eqn. 19)**

\*, \*\* indicates values significant at 5 percent and 10 percent level of significance respectively.

The estimated equation showed that although the explanatory power is not very strong, LiLi at its level and one lag level found to be statistically significant, trade as expected has positive effect on growth while the rate of population growth in the country was hindering the growth rate of per-capita real GDP and positive result of dummy reflects spurting Nepal’s stage of economic liberalization from 1992.

**Table 4: Regression Results of Estimating Equations (Set II)**

Eqn No.	Constant	LiLi	LiLi <sub>-1</sub>	Trade	GovCaEx	Invest	PopGrow	D1991	Adj R <sup>2</sup>	DW value
16	0.151	-0.20*	0.16*	0.13**	#	#	#	0.047	0.102	2.15
17	0.148	-0.20*	0.16*	0.13**	#			0.047	0.162	2.14
18	0.139	-0.19*	0.15*	0.12**		#		0.04	0.159	2.13
<b>19</b>	<b>0.163</b>	<b>-0.19*</b>	<b>0.15*</b>	<b>0.12**</b>			<b>-0.41**</b>	<b>0.04**</b>	<b>0.159</b>	<b>2.16</b>
20	0.11	-0.14*	0.14*		#	#		0.009**	0.068	2.19
21	0.021	-0.13*	0.14*		#		#	0.001**	0.059	2.08
22	0.079	-0.14*	0.15*			#	#	0.014	0.069	2.15

\*, \*\* indicates values significant at 5 percent and 10 percent level of significance respectively and # in the table shows non-significant values of the respective equations even at 10 percent level of significance.

### Test of Causality

The final representative equation 19 of the present empirical analysis is further analyzed for the Granger Causality Test (GCT) to ensure doubt on bidirectional relationship. The meaning is that if a variable X causes Y and vice-versa, it is possible that the regression of Y on X is statistically significant. The standard Granger Causality Equation is given as:

$$X_t = a + \sum_{i=1}^m b_i X_{t-1} + \sum_{j=1}^n Y_j Y_{t-j} + U_t$$

$$Y_t = a + \sum_{i=1}^q b_i X_{t-1} + \sum_{j=1}^r Y_j Y_{t-j} + U_t$$

Where,  $u_t$  and  $v_t$  are zero-mean, serially uncorrelated, random disturbances and the lag lengths  $m$ ,  $n$ ,  $q$  and  $r$  are assigned on the basis of minimizing Akaike's information criterion.

The variables Y is said to Granger Cause X, if the null hypothesis that  $H_0$ :

$y_1=y_2=y_3=.....=y_n=0$  is rejected against the alternative  $H_1$ : at least one  $y_i$  is not equal to zero for  $i=1, 2, 3, \dots, n$  in equation (A). Conceptually, Y granger causes X means that the past values of Y series can statistically enhance the forecasting capability of X series. Similar interpretation can be made for equation B.

Referring to the equation 19, the GCT is to perform between Growth and LiLi, since the only FD indicator found statistically significant during the analysis was LiLi. However, GCT may give bogus result if the variables are not stationary. Therefore, two variables Growth and LiLi are first tested for stationarity with Augmented Dickey-Fuller (ADF) test. The t-statistics and p-value for both these variables at level and first difference are shown in the Table 5.

**Table 5: Augmented Dickey-Fuller (ADF) Test of Growth and LiLi**

Variables	Test Statistics		P-Value	
	At level	At first difference	At level	At first difference
<b>Growth</b>	-6.416	-6.611	0.000	0.000
<b>LiLi</b>	-2.826	-6.412	0.0546	0.000

As depicted from the above Table 5, the GCT has to be conducted between Growth and first difference of LiLi (D(LiLi)) because these two variables follow same order of integration I (0) process. The

Akaike's information criterion became smallest in lag length of 3<sup>3</sup>, indicating the

<sup>3</sup> The Akaike's Information Criterion (AIC) for different lag lengths were found to be: -2.66, -2.62, -

appropriate length to conduct GCT. The GCT revealed that there is one directional causality from D(LiLi) to Growth as can be analyzed from the result provided in table 6. This test supported the result from equation 19 that it is one year lag form of LiLi that causes Growth but not vice-versa and suggest that the financial development indicators should be emphasized in order to achieve economic growth in the country like Nepal having underdeveloped and immature economy.

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2.83, -2.78 for lag lengths of 1, 2, 3 and 4 respectively.

**Table 6: Granger Causality Test between Growth and D(LiLi)**

Granger causality Wald tests			
Sample: 1975-2011			
Lags: 3			
Null Hypothesis	Obs.	Chi <sup>2</sup> Statistics	P-Value
D(LiLi) does not Granger Cause Growth	33	11.564	0.009
Growth does not Granger Cause D(LiLi)		1.472	0.689

### Conclusion

The results before introducing control variables showed that neither of the proxies of FD indicators showed significant impact on growth in the contemporaneous level. However, in the lag form of the variables, it showed mixed results depending on which proxy of FD has been used. The study showed that not all the measures of financial development indicators affect the economic growth. However, in the one lag form Liquid Liabilities of financial system to nominal GDP showed positive and significant impact on growth. The above findings were not altered even when using control variables and hence revealed that results were robust. As shown by the final representative equation, 1 percent increment in liquid liability to nominal GDP ratio would increase per-capita GDP by 0.15 percent by the next period. However, present level of liquid liability showed negative

impact on growth. The significant and positive impact of liquid liability to GDP ratio in one period lag cannot be discarded because of two reasons - 1) it measures the liquidity position of the nation which is essential for the investments and 2) the outcome of investment cannot be realized in the contemporaneous time. Also, it is hypothesized that the lagged effect of liquid liability on growth took place due to the weakness in the domestic financial system, especially in the post liberalization period, reflected in increasing level of Non-performing Assets (NPAs) of two big banks, namely Nepal Bank Limited and Rastriya Banijya Bank. Among the control variables, the economic liberalization in terms of increasing volume of trade showed positive and significant impact on growth – a one percent increase in total trade to GDP ratio has a nearly 0.14 percent increase in per-capita real GDP. The significant result of D1991 also showed spurred Nepal’s position

in economic liberalization from 1992. The nation's population growth has hindered the economic performance during the study period.

The results suggest that financial development, measured from liquid liability to GDP ratio, does matter for economic growth and hence for per-capita growth after one year lag. However, the effects, while significant, is time varying with differential impacts: contemporaneously it is negative but at one year lag it is positive. This may be because of the embryonic state of the

domestic financial system. To enhance the efficiency and effectiveness of the financial markets, it is recommended to seriously think on the financial environment in terms of determining the measures which have direct linkages on economic activities. However, the conclusions drawn is subjected to the methodology used and the quality of data, especially on real sector side and commercial bank used only as the proxy of the financial services system of the country.

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**Annexure 1: Graphs representing raw data of the study variables**

