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Financial Development and Economic Growth in Nepal

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ABSTRACT

Economic growth and financial development are closely related. The interaction between them is crucial and has attracted great attention of researchers. This study attempts to examine the relationship between economic growth and financial development in Nepal between 1975 and 2012. The paper has used Augmented Dickey-Fuller and Philips-Perron tests to test for the existence of unit root, Co-integration test to examine long run relationship and Granger Causality test to find out causal relationship. In addition, vector error correction method has been applied to find out the speed of adjustment and the dynamics of relationship. The empirical evidence confirms that the financial development causes economic growth. In fact, financial development is the cause for economic growth in terms of short-term dynamics, while economic growth sustains financial development in the long-run. Based on the empirical findings, this study recommends that it is necessary to launch the reform programs in the financial system to consolidate and improve the efficiency and effectiveness of the financial system as well as to cope with the emerging changes. Thus, it asks for the consolidation of the system not only for the positive reinforcement between economic growth and financial development but also for the post crisis resilience and sustainability.

JEL Codes: C51, E44, E47, G34, O11

Key Words: Financial Development, Economic Growth, Co-integration and Causality

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I. INTRODUCTION

Economic growth and financial development are closely related. The interaction between them is crucial and has attracted great attention of researchers and policy makers. Financial institutions basically facilitate the transfer of funds from surplus units to deficit units and provide benefits for both the saving units and deficit units in the societies (Mishkin, 1969). Over the past several decades, financial development has received considerable attention since the pioneer contribution of Goldsmith (1969), McKinnon (1973) and Shaw (1973) and has gained distinct importance in fostering economic development. A number of researchers particularly Ross Levine et. al. (1993), and Sara and Zorvovs (1993) have investigated the empirical relationship between finance and growth using mostly cross-country regression analysis and found the evidence that a well-functioning financial system promotes economic growth. In fact, financial system promotes economic growth through five major channels such as (a) reducing information and transaction cost, (b) improving the allocation of resources, (c) increasing savings rate, (d) promoting the development of markets and instruments and (e) providing efficient payments mechanisms (Levine, 1997; Islam et. al., 2004). Most of the cross-sectional analysis and some of the panel studies, on the one hand, report significant positive relation between finance and growth (King and Levine, 1993; Levine, 2003 & 2004; Rioja and Valev, 2004) and several recent panel studies, on the other hand, report about the weak or insignificant relationship between financial development and economic growth (Khan and Senhadji, 2000; Trabelsi, 2002; Favara, 2003).

These cross-sectional analyses are generalizing the relationship between finance and growth without considering the differences of structure and other factors which may vary across countries. Thus, it may not be wise to advocate any sort of opinion relating to the impact of financial sector on economic growth or vice versa based on such generalized empirical outcome. Rather, it is necessary to undertake a study to investigate the contributions of financial development to economic growth by focusing country specific factors by using time series data. In addition, it is also necessary to inquire about the effectiveness of consolidation undertaken in the financial system. However, the impact and direction of causality between finance and growth still remains a debatable issue in the literature.

The causal relationship between financial development and economic growth in developing economies has been of considerable interest among contemporary economists because of its tremendous policy implications. Despite of the increasing importance of financial system to achieve the national economic goal, economic analysis has attracted relatively little attention in the Nepalese studies. Given the countervailing arguments, this paper seeks to examine the relationship between financial development and economic growth in Nepal. Thus, the study uses time series data from 1975 to 2012 and employs Johansen's cointegrating vector error correction model to investigate this issue.

The primary purpose of this article is to examine the relationship between financial development and economic growth in Nepal by analyzing the time series data from 1975 and 2012. With the use of co-integration technique, it assesses whether long-run relationship exists between financial development and economic growth in Nepal. In addition, it also inquires about the causal relationship between them and direction of causality. The remainder part of the study is organized as the overview of financial system of Nepal in section II, literature review in section III and methodology of analysis in section IV. Section V discusses the empirical results and finally section VI concludes the paper.

II. OVERVIEW OF FINANCIAL SYSTEM IN NEPAL

Nepalese financial system is composed of deposit taking and contractual saving institutions. The deposit taking financial institutions include commercial banks, development banks, micro-credit development banks, finance companies, financial cooperatives, non-government organizations (financial) performing limited banking activities (NRB, 2005). Likewise other contractual saving organizations (popularly known as other financial institutions) comprise insurance companies, employee's provident fund, citizen investment trust, postal saving offices and Nepal stock exchange.

Nepal Rastra Bank, the central bank of Nepal regulates the banking sector comprising commercial banks, development banks, finance companies and micro credit development banks/institutions. In addition, it also supervises the savings and credit cooperatives and financial non-government organization, licensed by it for undertaking limited banking transactions, only. However, the regulation and supervision of Employees Provident Fund, Citizen Investment Trust, Insurance companies (life and non-life) and stock exchange, is outside the purview of the central bank. More importantly, more than ten thousand cooperatives have been undertaking financial transactions and some of them are even bigger than small development banks. They are still outside of any closed supervision and can be vulnerable for the stability financial system.

Commercial banks are the largest part of the financial sector, 51.1 percent in July, 2012 (NRB, 2012). However, the development banks are growing faster and possessing a major chunk of financial assets gradually. Hence, the central bank has started expanding monetary survey incorporating development banks and finance companies. Nepal Rastra Bank Act, 2002 and Banks and Financial Institutions Act, 2006 provide central bank with necessary legal background pertaining to the regulation and supervision of banks and financial institutions. Although Nepal Bank Ltd, the first commercial bank, was established as early as in 1937, the banking expansion took place especially with the establishment of Central Bank of Nepal, called Nepal Rastra Bank (NRB) in 1956, which later initiated the expansion of banking service in Nepal. Up to 1975, there were only two commercial banks and two development banks and until 1980's, the Nepalese financial system was characterized by a repressive financial system incorporating various controls on interest rate and exchange rates,

reserve requirement and directed credit, complex rule for money and capital markets (Bhetuwal, 2007). In the mid-1980's, with the adoption of financial liberalization policy, the number of banks and financial institutions started to grow rapidly. As a result of remarkable proliferation in the financial system, there are 30 commercial banks, 84 development banks, 53 finance companies and 37 micro-credit development banks (As of July 2014). The banking sector now provides banking services through 3430 branches² and contributes around 3.0 percent to gross domestic product (GDP).

In order to strengthen the financial system, Nepal initiated financial sector reform programs in the late 1990's, which resulted in several positive changes in the financial sector (Bhetuwal, 2007). The reform agenda was incorporated in macroeconomic policies to improve business conditions and enhance economic activities. Consequently, the ratio of total banking sector's assets to GDP went up to 125.5 percent in July 2013 (NRB, 2013) from 35 percent in 1994 and the ratio of private sector credit to GDP also increased to 64 percent in 2011 from 20 percent in 1994 (MOF, 2012).

Nowadays, the relationship and importance of financial system in economic development of many countries is well documented. However, there is still a dearth of literature about the relationship between financial system and economic growth in Nepal, along with causality between them and direction of causality amidst the financial expansion in the country. Hence, this study intends to assess relationship between financial system and economic growth and find out the significance of financial development in Nepalese economy to draw some conclusions for further policy reforms.

III. REVIEW OF LITERATURE

Finance has various economic effects and these effects can be both positive and negative. Several studies have measured economic impact of finance and concluded about its significance for the economy. Patrick (1966) points out two possible causal relationships between financial development and economic growth; they are supply leading hypothesis and demand-following hypothesis. The supply leading hypothesis assumes a causal relationship from finance to growth through creating financial institutions and markets and increasing supply of financial services whereas the demand-following hypothesis assumes a causal relationship from economic growth to financial development through growth induced demand for financial services (Calderón and Liu, 2002; Islam et. al., 2004).

In fact, the banks and financial institutions play positive role in mobilizing financial resources, identifying good projects, monitoring managers, and managing risk (Levine 1997, 2000). Likewise, banks can make firms reveal information and pay back their debts thereby facilitating expansion and long-run growth. From a development perspective, the banking

² Nepal Rastra Bank (2014) source: [www:nrb.org.np](http://www.nrb.org.np)

system performs significant role because financial intermediation creates an environment more conducive for transforming a traditional economy into a modern one (Vitlos, 2001).

A number of researchers such as Gurley and Shaw (1967), Goldsmith (1969) and Jung (1986) find causal direction from economic growth to financial development. Likewise, Murende and Eng (1994), Rousseau and Watchel (1998), Neusser and Kugler (1998), Graff (2002) and Islam, Habib and Khan (2004) have argued in favor of unidirectional causality from finance to growth, whereas some others find the evidence of bi-directional causality between finance and growth (Demetriades and Hussein, 1996, Bethelmy and Varoudakis, 1996, Luintel and Khan, 1999). Arestis and Demetriades (1997) and Shan et. al. (2001) have focused on heterogeneity in finance-growth causal relation whereas Ram (1999) argues the weak relationship between finance and economic growth. Demirguc-Kunt and Levine (2001), using a broad data set covering 48 countries from 1980 to 1993, find that the quality of its financial services are most important for fostering economic growth.

Regarding the causality between financial and economic development variables some scholars such as Ang and McKibbin (2007), Islam et. al. (2004), Shrestha and Chowdhury (2006 and 2007), Bhetuwal (2007), Tahir (2008) and Kharel and Pokhrel (2012) have examined the role using country specific cases of Malaysia, Pakistan, Nepal, Bangladesh and Nepal respectively. Ang and McKibbin (2007) took the sample period of 1960-2001 and used variables including the ratio of commercial bank assets to central bank assets plus commercial bank assets, the ratio of domestic and private sector credit to nominal GDP as proxies of financial development. They found that growth and financial variables had a positive relationship. In the short-run, no Granger causality was found between financial variables and economic growth in all models. ECM based causality results showed unidirectional causality from economic growth to financial development.

Similarly, the study of Islam et. al. (2004) examined causality between financial development and economic growth in Bangladesh over the period of 1975 to 2002 by employing five alternative indicators financial development such as money stock to GDP (M3Y), Private sector credit to GDP and Domestic credit to GDP). They found a causal direction from economic growth to financial development and argued about the growth led financial development in Bangladesh.

Shrestha and Chowdhury (2006) assessed the relationship between financial liberalization and economic development in Nepal by constructing Financial Liberalization Index based on principal component methods. Representing eight major financial liberalization components,³

³ Their index includes; interest rate deregulation, pro-competition measures, reserve requirements, directed credit, bank's ownership, prudential regulation, stock markets and international financial liberalization

their index examined the extent of financial liberalization in Nepal during 1984 to 2005. They found the degree of liberalization in Nepal was highest during 1984-1994. Likewise in another study, Shrestha and Chowdhury (2007) examined the financial liberalization hypothesis employing autoregressive distributed lag (ARDL) modeling approach on Nepalese data. Their results showed that the real interest rate affects both savings and investment positively.

Bhetuwal (2007) undertook a study on financial liberalization and financial development in Nepal and argued about an efficient financial system could effectively mobilize and allocate resources leading to robust economic growth. Financial liberalization improves the functioning of financial system by increasing the availability of funds and allowing risk diversification and increased investment. Using financial liberalization and financial development indices generated by the principal component method, he examined about the effectiveness financial liberalization and financial sector development in Nepal. He found a continuous and gradual process of financial liberalization and argued about the presence of bi-directional causal relationship between the liberalization of financial sector and the level of financial development in Nepal.

Tahir (2008) explored the relationship between economic and financial development in Pakistan for the period of 1973 - 2006. He used vector error-correction modeling to identify the causality between economic and financial development and the exogeneity of the variable(s). By employing Johansen's multivariate co-integrating procedure, he derived error correction terms and indicated that, in the long run, economic development causing financial development. The study concludes that financial development is seen to be ineffective in terms of economic development determination in Pakistan.

However, Kharel and Pokhrel (2012) investigated the role of financial structure in economic growth of Nepal during 1994-2011 using Johansen's co-integrating vector error correction model. They argued that the banking sector plays a key role in promoting economic growth compared to capital market in Nepal. They favoured the policy to be focused on the banking sector development by enhancing its quality and outreach to promote economic growth in Nepal. In a recent study, Timsina (2014) examined the impact of commercial bank credit on economic growth in Nepal using time series data for the period of 1975-2013. Employing Johansen Cointegration Approach and Error Correction Model, the study found positive effects of bank credit to the private sector on the economic growth only in the long run. It also indicated the feedback effect from economic growth to private sector credit in the short run.

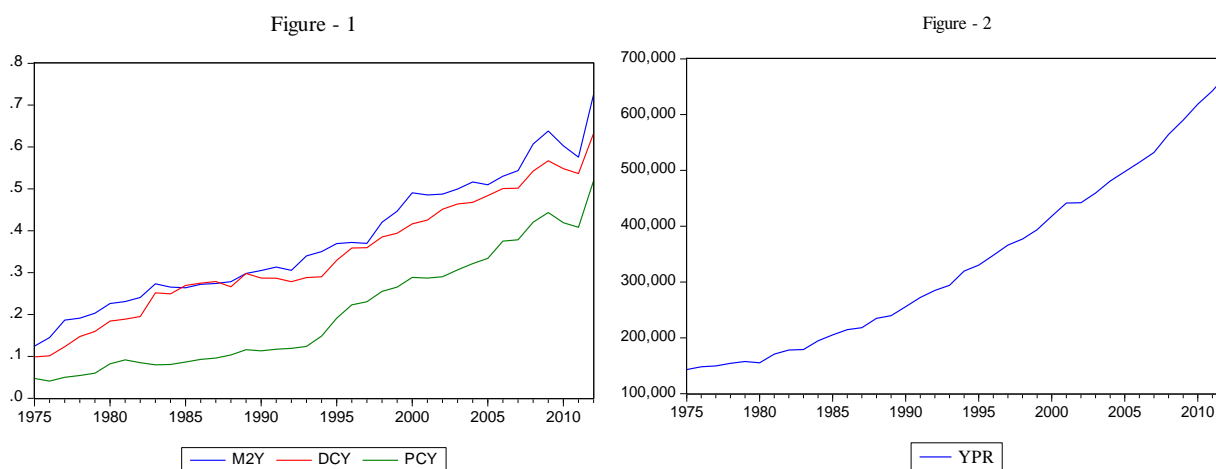
To summarize on the whole, it may not be inconsistent to say that the relationship between financial and economic development is unclear in terms of causality and direction. In addition, the effectiveness of financial sector development and consolidation policies in terms of economic development is also unclear. On the other hand, the studies undertaken in Nepalese perspective are not found to be incorporating the issues of causality and

effectiveness of consolidation process incorporating finance-led or growth-led hypothesis. Hence, a separate study seems to be necessary to examine the relationship between the variables of financial development and economic growth in a time series framework.

IV. DADA AND METHODOLOGY

Financial development variable is defined as in Islam et. al. (2004), Tahir (2008), and Kharel and Pokhrel (2012), though there is no unanimous view on it. Domestic credit (DC) provided by the banking sector can be used in this study as a major indicator of the banking sector development (Levine, 2003). In fact, it plays an important role for investment financing in developing countries. It has been accepted that, broad money stock is also a leading indicator of monetization in the economy and shows the real size of the financial sector in the country (Gregorio and Guidotti, 1995; Kar and Pentcost, 2000). Likewise, the private sector credit flows accurately represents the actual volume of funds channeled into the private sector from banks and financial institutions and indicates actual financial intermediation in the economy (Gregorio and Guidotti, 1995). Hence, it can be also equally important indicator for representing financial sector development. Finally, the economic growth variable is defined as the growth in GDP that indicates real sector growth in constant prices (YPR).

Here, the level of financial development (FD) is defined using either any of above mentioned financial development indicators. The first one, as the ratio of domestic credit to GDP (DCY); second one, as the ratio of broad money to GDP (M2Y) and the third one, as the private sector credit to GDP (PCY) in nominal values. Figure - 1 exhibits the trend of these three alternative financial development indicators (DCY, M2Y and PCY) whereas Figure - 2 exhibits the trend of economic growth variable (YPR). This paper utilizes time series data published in Economic Survey of Ministry of Finance (MOF, 2012) and Quarterly Economic Bulletin published by NRB(NRB, 2012).



The model for the analysis is specified as follows:

$$YPR_t = \alpha_0 + FD_t + \hat{u}_t ; \quad \dots\dots\dots (1)$$

where, YPR represents log of real GDP at time t, FD refers to the log of real financial development indicator (ratios) at time t and \hat{u}_t is the error term at the same time period.

First of all, unit root test has been carried out to each series individually in order to test the time series properties of the data. Non-stationary data contain unit root and generates spurious result. Here, Augmented Dickey-Fuller Test (ADF)⁴ and Phillip-Perron (PP) test are computed. .

As this paper examines whether financial development matters for economic growth or alternatively economic growth matters for financial development, financial development indicators have been included in the model with the assumption that overall financial system has a positive impact on growth or vice versa. Following Beck et. al. (2002), Islam et. al. (2004) and Tahir (2008), broad money stock, domestic credit and private sector credits have been considered as a proxy for financial sector development and real gross domestic product as growth variable. Testing number of co-integrating relationships (r) is an important issue in this analysis because the long run relationship among variables cannot be indentified if $r \neq 1$. The result is derived using Johansen Co-integration Test.

Following Johansen (1988), we employ two likelihood ratio tests namely eigenvalue [$\lambda_{\max}(r/r+1)$] and trace statistic [$\lambda_{\text{trace}}(r/p)$] tests for the determination of r as follows:

$$\lambda_{\text{trace}}(r/p) = -T \sum_{i=r+1}^p \log(1 - \hat{\lambda}_i) \quad \dots\dots\dots (2)$$

$$\lambda_{\max}(r/r+1) = -T \log(1 - \hat{\lambda}_{r+1}) \quad \dots\dots\dots (3)$$

where $\hat{\lambda}$ is computed eigenvalue up to p lags and p is chosen up to the level which removes serial correlation. Equation (2) tests the null hypothesis that there are at most r co-integrating vectors against k where k is number of variables used in the model, whereas Eq. (3) tests the null hypothesis of r co-integrating vectors against the alternative of r+1. In this setting, a significant and positive sign of $\hat{\lambda}$ indicates that financial development has a positive impact on economic growth. However, a negative sign of parameters implies contractionary impact and insignificant coefficient of the parameter denotes no effect on economic growth. The critical values for examining the $\lambda_{\max}(r/r+1)$ and $\lambda_{\text{trace}}(r/p)$ are taken from Osterwald-Lenum (1992).

⁴ The error in DF test might be serially correlated. The possibility ...

It is also to note that the co-integration tests are very sensitive to the choice of lag length. Following Islam et.al. (2004) and Tahir (2008) after confirmation of the existence of co-integration between the variables in the equation, the Granger Causality test has been performed.

The traditional practice in testing the direction of causation between two variables is the Granger causality test. According to Granger (1988), X causes Y if the past values of X can be used to predict Y more accurately than simply using the past values of Y. In other words, if a past value of X improves the prediction of Y with statistical significance, then we can conclude that X "Granger Causes" Y. The Granger causality test consists of estimating the following equations:

$$YPR_t = \beta_0 + \sum_{i=1}^n \beta_{1i} YPR_{t-i} + \sum_{i=1}^n \beta_{2i} FD_{t-i} + U_t \quad \dots\dots equation \quad \dots\dots\dots (4)$$

$$FD_t = \alpha_0 + \sum_{i=1}^n \alpha_{1i} FD_{t-i} + \sum_{i=1}^n \alpha_{2i} YPR_{t-i} + V_t \quad \dots\dots equation \quad \dots\dots\dots (5)$$

Where U_t and V_t are uncorrelated and white noise. Causality of financial development indicators to economic growth may be determined by estimating Equations (4) and (5) and

testing the null hypothesis that $\sum_{i=1}^n \beta_{2i} = 0$ and $\sum_{i=1}^n \alpha_{2i} = 0$ against the alternative hypothesis

that $\sum_{i=1}^n \beta_{2i} \neq 0$ and $\sum_{i=1}^n \alpha_{2i} \neq 0$ for equations (4) and (5) respectively. If the coefficient of

α_{1i} is statistically significant but β_{1i} is not statistically significant, then YPR is said to have been caused by FD (unidirectional). The reverse causality holds if coefficients of β_{2i} are statistically significant while α_{2i} is not. But if both β_{2i} and α_{2i} are statistically significant, then causality runs both ways (bi-directional).

The evidence of co-integration allows using a vector error correcting modeling of the data to formulate the dynamic of the system. If both variables YPR and FD are co-integrated then there is a long run relationship between them. Short-run relationship between the variables will be conducted using error correction model (ECM) under the framework of cointegrating relationship.

According to Engle and Granger (1987), the Error Correction Model can be specified as follows for any two pairs of test variables:

$$\Delta YPR_t = + p_1 Z_{t-1} + \alpha_1 \Delta FD_t + U_{1t} \quad \dots\dots\dots (6)$$

$$\Delta FD_t = + p_2 Z_{t-1} + \beta_1 \Delta YPR_t + U_{2t} \quad \dots\dots\dots (7)$$

Statistical significance tests are conducted on each of the lagged Z_t term in Equations (6) and (7). The coefficients of the Z_t reflect the short run disequilibrium in the model. The parameters, p_1 and p_2 , are the speed of adjustment parameters in equation (6) and (7) when there is a discrepancy from long run equilibrium.

V. EMPIRICAL RESULTS AND DISCUSSION

At the beginning of the impact analysis, it becomes crucial to check for stationarity of the variables of interest as regression with non-stationary time series data may lead to spurious result. Thus, the analysis proceeds for the unit root test using ADF (1979, 1981) and Philips and Peron (1990) for both the variable YPR and FD. Table 1 presents the results of unit root test. The ADF and PP Test results confirm that the time series data of the variables in the model are non-stationary in their level form. However these variables are found to be stationary in their first difference.

Table 1: Unit Root Test

Variables	Test Statistics		Order of Integration
	ADF	PP	
Growth Variable ΔYPR	-75816* (0.000)	-7.6355* (0.009)	I (1)
Financial Development Variable (FD)			
Δ DC2Y	-4.8678* (0.0003)	-5.0293* (0.0002)	I (1)
Δ M2Y	-4.7927* (0.0004)	-4.7927* (0.0004)	I (1)
Δ PC2Y	-5.0144* (0.0002)	-5.0144** (0.0002)	I (1)

Note: Critical values for 1 percent, 5 percent and 10 percent are -3.627, -2.946 and -2.612 respectively.

* (**) denotes rejection of the hypothesis at the 1percent (5percent) level. The values inside the parenthesis are probabilities.

The result exhibited that the variables are stationary in first difference. Hence, one can estimate the long run relationship using Johansen Co-integration Test. Given the same order of integration; it is desirable to test whether the series are co-integrated over the sample period. Table 2 shows the results of the Johansen co-integration test. The null hypothesis of no co-integration ($r = 0$) is tested against at least one co-integration ($r \geq 1$) for a model. Here, the null hypothesis of $r = 0$ is rejected at 5% level of significance in favour of one co-integrating relationship ($r \geq 1$) suggested by both $\lambda_{\max}(r/r+1)$ and $\lambda_{trace}(r/p)$ criteria. Both tests, however, show the order of integration as $r = 1$ and thus indicated that there is a co-integrating equation at 5% significance level. The existence of co-integration implies that there is long-

run relationship between the variables in our model under consideration. Three alternative financial development indicators are co-integrated with the growth variable. Hence, based on analysis and econometric properties, the analysis confirms that there exists co-integrating relationship between the variables under review and it is consistent with conventional wisdom and empirical literature too.

Table 2: Johnson's Co-integration Test
Lags interval (in first differences) 1 to 1

Null Hypothesis	Eigen-value	λ_{\max}	Critical Value 5%	λ_{Trace}	Critical Value 5%
<i>Variables: YPR and DCY</i>					
$r = 0$	0.556	29.257*	14.264	30.555*	15.494
$r \leq 1$	0.035	1.298	3.841	1.298	3.841
<i>Variables: YPR and M2Y</i>					
$r = 0$	0.597	37.755*	14.264	33.008*	15.494
$r \leq 1$	0.0069	0.252	3.841	0.252	3.841
<i>Variables: YPR and PCY</i>					
$r = 0$	0.410	19.015*	14.264	19.024*	15.494
$r \leq 1$	0.0002	0.009	3.841	0.009	3.841

Note: Variables in the co-integrating vectors: YPR and DCY, M2Y and PCY

* denotes rejection of the hypothesis at the 5 percent level.

Both Max-eigenvalue and Trace test indicate 1 co-integrating relationship.

The results of the Granger Causality Test between economic growth (YPR) and variables of financial development (FD) are reported in Table 3. The first row in the table reports about the causality between economic growth variable proxied by real GDP (YPR) and financial development variable proxied by DCY. The Wald F-statistics for this equation (with a lag of one to four) are 3.344, 5.2847, 6.536 and 3.432 respectively which is statistically significant at both 1 percent and 5 percent. Similarly, the second row in the table reports about the causality between DCY and YPR. The result exhibited in the table clearly indicated that causality also runs from DCY to YPR (with F-statistics of 6.576, 5.465, 6.686 and 3.577 respectively).

The third row in the table, reports about the causality between economic growth proxied by YPR and financial development proxied by Broad Money (M2Y). The Wald F-statistics for this equation (with a lag of one, two, three and four) is 18.151, 11.359, 3.630 and 4.011 respectively which is statistically significant at both 1 percent and 5 percent significance level. Similarly, the fourth row in the table reports about the causality between YPR and M2Y. The Wald F-statistics for this equation (with a lag of one to four) is 5.996, 6.666 and 5.896 and 3.558 respectively which is statistically significant at both 1 and 5 percent.

Likewise, the fifth row in the table reports about the causality between YPR and financial development variable proxied by private sector credit (PC2Y). The Wald F-statistics for this equation (with a lag of two and four) is 5.765, and 3.813 respectively which is statistically significant at both 1 percent and 5 percent. However it is not significant with a lag of one and three. Nevertheless the last row in the table reports about the causality between PC2Y and YPR. The Wald F-statistics for this equation with a lag of one to three are significant at both 1 percent and 5 percent.

Table 3: Granger Causality Tests

Sample: 1975 - 2012

Null Hypothesis:	Lag 1	Lag 2	Lag 3	Lag 4
YPR does not Granger Cause DCY	3.344** (0.0762)	5.2847* (.0106)	6.536* (0.007)	3.432* (0.0228)
DCY does not Granger Cause YPR	6.576* (0.0149)	5.465* (.0093)	6.686* (0.0015)	3.577* (0.0194)
YPR does not Granger Cause M2Y	18.151* (0.0002)	11.359* (0.0002)	3.630* (0.0249)	4.011* (0.0120)
M2Y does not Granger Cause YPR	5.996* (0.0196)	6.666* (.0039)	5.896* (0.0051)	3.558* (0.0198)
YPR does not Granger Cause PCY	1.323 (0.258)	5.765* (0.0074)	1.915* (0.0150)	3.813* (0.0149)
PCY does not Granger Cause YPR	5.225* (0.0286)	3.007** (0.0640)	2.063 (0.1277)	1.658 (0.191)

Note: The value outside the parenthesis is F-Statistic and inside the parenthesis is probability.

* and ** denotes rejection of hypothesis at 5% and 10% respectively..

Thus, it shows that the past values of economic growth and financial development indicators do granger cause for each other. It means that past values of YPR do Granger cause financial development and vice versa. Hence, the analysis confirms the bidirectional causality between the financial development and economic growth in Nepal during the period 1975 – 2012.

To determine the short-run dynamics, error correction model is estimated. The focus of the Vector Error Correction analysis is on the lagged Z_t terms. These lagged terms are the residuals from the previously estimated co-integration equations. In the present case the residual from two-lag specification of the co-integration equations were used in the Error Correction estimates. Lagged Z_t terms provide an explanation of short run deviations from the long run equilibrium for the equations. Lagging these terms means that the disturbance of the last period will impact the current time period.

Statistical significance tests are conducted on each of the lagged Z_t term in Equations (6) and (7). In general, finding statistically insignificant coefficients of the Z_t term implies that the system under investigation is in the short run equilibrium as there are no disturbances present. If the coefficient of the Z_t term is found statistically significant, then the system is in

the state of the short run disequilibrium. In such a case the sign of the Z_t term shows the speed of adjustment between the variables and the status (stability) of equilibrium. Estimation results of Equations (6) and (7) (three alternative indicators of FD with YPR) are summarized in Table – 4.

Table: 4**i. Vector Error Correction for YPR and DCY**

$$\Delta YPR = -0.0688Z_{t-1} + 0.0695 + 1.435\Delta DCY_{t-1} - 1.104\Delta DCY_{t-2} - 0.199\Delta YPR_{t-1} - 0.474\Delta YPR_{t-2} \dots (6a)$$

(-3.388)* (-5.133)* (2.091)** (-1.681)** (-1.132) (-2.830)**

R-Square: 0.44 Adj. R-squared: 0.35 F-statistic: 4.68

$$\Delta DCY = -0.0273Z_{t-1} + 0.0001 + 0.1486\Delta DCY_{t-1} + 0.114\Delta DCY_{t-2} + 0.377\Delta YPR_{t-1} + 0.088\Delta YPR_{t-2} \dots (7a)$$

(-5.046)* (0.036) (-0.959) (0.769) (0.946) (2.330)*

R-Square: 0.61 Adj. R-squared: 0.54 F-statistic: 9.00

ii. Vector Error Correction for YPR and M2Y

$$\Delta YPR = -0.1557Z_{t-1} + 0.0641 + 0.0655\Delta M2Y_{t-1} + 0.451\Delta M2Y_{t-2} - 0.359\Delta YPR_{t-1} - 0.273\Delta YPR_{t-2} \dots (6b)$$

(-3.771)* (5.010)* (0.906) (0.593) (-2.21)** (-1.751)*

R-Square: 0.42 Adj. R-squared: 0.32 F-statistic: 4.25

$$\Delta M2Y = -0.0348Z_{t-1} + 0.005 - 0.063\Delta M2Y_{t-1} - 0.316\Delta M2Y_{t-2} + 0.013\Delta YPR_{t-1} - 0.001\Delta YPR_{t-2} \dots (7b)$$

(4.185)* (2.198)** (-0.436) (-2.063)** (0.395) (-0.038)

R-Square: 0.38 Adj. R-squared: 0.27 F-statistic: 3.55

iii. Vector Error Correction for YPR and PCY

$$\Delta YPR = -0.0131Z_{t-1} + 0.069 + 0.167\Delta PCY_{t-1} - 0.750\Delta PCY_{t-2} - 0.294\Delta YPR_{t-1} - 0.236\Delta YPR_{t-2} \dots (6c)$$

(-2.528)* (5.189)* (0.321) (-1.413)** (-1.745) (-1.429)*

R-Square: 0.28 Adj. R-squared: 0.15 F-statistic: 2.21

$$\Delta PCY = -0.0422Z_{t-1} + 0.0071 + 0.400\Delta PCY_{t-1} - 0.023\Delta PCY_{t-2} - 0.032\Delta YPR_{t-1} - 0.028\Delta YPR_{t-2} \dots (7c)$$

(-2.674)* (1.760)** (2.518)** (-0.142) (-0.627) (-0.568)

R-Square: 0.38 Adj. R-squared: 0.27 F-statistic: 3.52

Note: Values in the parentheses are t values and *, ** and *** indicate 1%, 5%, and 10% level of significance respectively.

In equation (6a), the error correction and second lag of economic growth are significant at 1.0 percent level along with first and second lag of DCY (significant at 5.0 percent). Similarly, in equation (7a) the error correction term and second lag of economic growth is significant at 1.0 percent level. It depicts that the change in economic growth is explained by the change in financial development. In addition, it is clear from the estimate of equations (6a) and (7a) that both variables, YPR and DCY, respond to a short term deviation from long run equilibrium. Therefore, as both of the speed adjustment parameters, p_1 and p_2 , are negative and significant, indicate that both variables respond to the discrepancy from long run equilibrium. Likewise other equations can be explained in a similar fashion and the result clearly shows the relationship between the indicators of FD and economic growth (equation 6b, 7b and equation 6c and 7c)

Granger causality in a co-integrated system needs to be reinterpreted. In the above, co-integrated system Z_t granger causes YPR and FD in all equations, since lagged values of the Z_t entering Equations (6) and (7) are statistically significant. When the results of estimation of Equations (6) and (7) are analyzed together, it is clear that a bi-directional causality exists between real gross domestic product and financial development.

VI. CONCLUSION

The relationship and causality between financial development and economic growth is the central focus of this study, which is found to be positive and significant. Not only this, it also found that financial development matters for economic growth and economic growth also sustains for the financial development. The study supports both demand driven and supply leading hypotheses in case of Nepal. It is consistent with the results of Islam et. al (2004) that used the data for Bangladesh, Tahir (2004) that used data for Pakistan and also with Kharel and Pokhrel (2012) that used data for Nepal, to some extent. However, it differs with Timsina (2014) regarding the direction of causality between bank credit and economic growth only. This study assessed the impact of private sector credit of banking system in contrast to Timsina (2014) which used credit of commercial banks only in real terms. Nevertheless, the conclusion of this paper should be analyzed cautiously considering sample size, financial structure and level of development.

It is necessary to undertake necessary measures to enhance the growth in both financial and economic activities considering the potential and bidirectional causality between financial development and economic growth in Nepal. Similarly, it is necessary to create investment friendly environment to encourage the investment and growth. There remains, however, the challenge of more reforms and consolidation that are needed to increase further the performance and competitiveness of the financial sector. Though the relationship seems to be strong, it would be imperative to undertake policy measures to make the financial system more inclusive without losing stability even in changing times. There can be more rooms for

further research by incorporating the data of other financial institutions including provident fund, stock exchange and insurance companies as well as incorporating alternative measures of financial and economic development.

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