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## **Editorial**

SEBON has come up with the Volume VII of SEBON Journal incorporating articles from expert in their respective field. SEBON had initiated to publish Journal in June 2004 which was continued till July 2013 with the publication of Volume- VI. The publication of Journal was stopped for the past few years due to other priority works of SEBON.

The articles incorporated in the Journal encompasses the Ownership structure, risk and performance; Stock returns and trading volume relation; Factors affecting stock index; Role of financial institutions in economic growth; Fair trading strategy; Book building pricing mechanism; Effect of macroeconomic variables on stock market index; Asset liquidity and capital structure: Bank specific and macroeconomic determinants of banking profitability: and corporate social responsibility.

The articles have been selected on the basis of research orientation, applicability, creativity, novelty, conceptual clarity, and coverage. Attempts have been made to incorporate quality articles in the journal and make available to readers who are interested in the area of Nepalese capital market. We believe that this volume like the previous one will prove to be inspiring to the research scholars, academicians, practitioners, policy makers. and investors to contribute in their areas of interest.

We are responsible for any errors and deficiencies that may have remained in the journal. Any comments and suggestions for its improvements will be highly appreciated. We believe that all who have contributed the articles, and helped us directly or indirectly to bring out this volume of SEBON Journal. The opinions made in the articles solely the opinions of the authors and do not necessarily reflect the opinions of the institutions they are associated with and that of publishers.

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# Ownership structure, risk and performance in Nepalese banking sector

**Radhe S. Pradhan, PhD**

**Bindu Pantha<sup>1</sup>**

## **Abstract**

*This study examines the effect of ownership structure on risk and performance of Nepalese commercial banks. The return on equity, net interest margin and credit risk are the dependent variables. The independent variables are foreign ownership, government ownership, private ownership, leverage, liquidity, bank age, bank size and deposit. The main source of data includes various issues of Banking and Financial Statistics, Quarterly Economic Bulletin and Bank Supervision Report published by Nepal Rastra Bank and annual reports of selected commercial banks. The study is based on the secondary data for the period of 5 years from 2010/11 to 2014/15. The data are collected for 24 Nepalese commercial banks, leading to the total of 120 observations. The regression models are used to examine the effect of ownership structure on risk and performance of Nepalese banking sector.*

*The study reveals that foreign ownership, liquidity ratio, bank size and bank age are positively related to return on equity and net interest margin of Nepalese commercial banks. It indicates that higher the foreign ownership, liquidity ratio, bank size and bank age, higher would be the return on equity and net interest margin. Similarly, government ownership and foreign ownership are positively related to credit risk. It indicates that higher the government ownership and foreign ownership, higher would be the credit risk. Likewise, government ownership is negatively related to return on equity and net interest margin. It reveals that higher the government ownership, lower would be the return on equity and net interest margin in Nepal.*

**Keywords:**Return on equity, net interest margin, foreign ownership, government ownership, private ownership.

## **1. Introduction**

A bank is a financial intermediary that accepts deposits and channels those deposits into lending activities. Profitability is the major reason for banks to take greater amount of risk and make business successful. As a financial intermediary, bank plays a crucial role in the operation of most economies. It is the central source of investment fund. Ownership structure is considered as an important factor that affect a firm's health. If the ownership structure affects firm's health, then it is possible to use the ownership structure to predict the probability of default. Peng (2004) pointed out that these parathion of ownership and control may create conflict of interests between owners and managers. Foreign owned banks exhibit a higher performance than other banks, particularly in developing countries (Micco et al., 2007). Regarding the nature of owners, Alchian (1965) suggested that private firms should perform more efficiently and more profitably than both government-owned and mutual firms.

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Barth et al. (2001) found that greater government ownership is associated with less efficient and less developed financial systems. State owned banks have greater proportions of nonperforming loans than other banks. Tehranian et al. (2010) found a positive relationship between government participation in bank ownership and risk. As per these studies, state owned banks have poor loan quality and higher default risk than privately owned banks.

Gursoy and Aydogan (2002) examined the impact of ownership structure on performance and risk-taking behaviour of Turkish firms. This study concluded that there is a significant impact of ownership on both performance and risk-taking behaviour of Turkish firms. Higher concentration leads to better market performance. The study also found that the family owned firms seem to have low performance with low risk.

Foreign banks are encouraged to enter and expand banking operations in the many countries. The foreign banks are more efficient than local banks (Kamau, 2009). There is a negative relationship between government ownership banks and bank profitability (Antoniadis and Sarriades, 2010). Tehranian et al. (2010) found that the relationship between government participation in bank ownership and risk is positive and significant. The study concluded that state owned banks have poor loan quality and higher default risk than privately owned banks.

Profitability is the major reason behind every one to take greater amount of risk and make business successful. It is the central source of investment fund. In banking sector, the importance of bank's profitability can be appraised at the micro and macro levels of economy (Kosmidou, 2008). Since last few decades, it is believed that there is a connection among ownership structure and performance in banks. The relationship between ownership structure and performance are studied extensively at different point of time. Private ownership has a positive effect on firm profitability and growth and negative effect on firm valuation and risk (Chen, 2012).

Changes in credit risk may reflect changes in the health of a bank's loan portfolio which may affect the performance of the institution (Cooper and Schindler, 2009). The variation in banks' profitability is related to variation in credit risk, since increased credit risk is normally associated with decreased firm profitability. Swamy (2012) found that larger the size of the bank, lower the risk management strategy. Lin and Chu (2005) concluded that increase in bank size reduces the future credit risk. Diamond and Raghuram (2000) opined that there is a positive relationship between liquidity risk and credit risk.

Athanasioglou et al. (2008) suggested that bank risk taking has pervasive effects on bank profits and safety. Dietrich and Wanzenreid (2009) found a positive and statistically significant relationship between bank size and bank profitability. In addition, Saleem and Rehman (2011) concluded a significant and positive relationship between liquidity and profitability. Yazdanfar and Ohman (2015) examined the effect of three different forms of debt ratios, i.e. trade credit, short-term debt, and long-term debt on profitability. The study found a negative relationship between all types of debts and profitability in Swedish SMEs. Jeon and Miller (2006) concluded that higher the debt ratio, the more leveraged the company and the greater its financial risk.

Profitability is the first and foremost required thing to satisfy shareholders and economic prosperity lies within the successful conducting of the overall banking services. Gaur & Gupta (2011) supported the positive relationship arguing that experience through age helps the business to perform better. Jonsson (2007) argued that younger firms are more difficult to monitor, since there is no past record of performance. Omran (2007) analysed sample of 12 banks from Egypt between 1996 and 1999. During which the ownership is transferred from public sector to private sector. After privatisation, the results showed that some coefficients in profitability and liquidity for bank privatised decreased significantly but other performance measure remain unchanged.

Sullivan and Spong (2007) showed that stock ownership by hired managers is positively linked to bank risk, meaning that under certain conditions hired managers operate their bank more closely in line with stockholder interests. Curak et al. (2013) found a negative relationship between size and nonperforming loan. Cebenoyan and Strahan (2004) revealed that there is no difference between mutual and private ownership on bank performance. Altunbas et al. (2007) found that there is little evidence that private owned banks are more efficient than their mutual and state-owned firms. On the other hand, Fungacova and Poghosyan (2011) revealed that state-owned banks are inconsistent with the optimistic development theories of government ownership banks. Wahla et al. (2012) found that managerial ownership has a significant negative relationship with firm performance, whereas concentrated ownership has insignificant relationship with firm performance.

In the context of Nepal, Bist et al. (2014) showed that foreign ownership has significant and positive impact on bank performance. The result showed statistically significant positive beta coefficients for foreign ownership with bank profitability. The study indicated that foreign ownership brings improvement in the performance of the local banks. Bam et al. (2015) examined the impact of foreign banks' presence on the performance of Nepalese commercial banks. Specifically, the study attempted to analyse the influence of foreign banks' presence on interest rate spreads, operating expenses, profitability and risk. The study found that foreign entry and foreign ownership have positive and significant impact on operating expenses of Nepalese commercial banks.

Adhikari (2010) showed that foreign bank introduces new technologies techniques, high skills, and international experiences in the domestic market. Domestic banks can have ample opportunities to learn and adopt such international practices. Gajurel and Pradhan (2012) found that there exists monopolistic competition in Nepalese banking industry and there is lower competition among banks in non interest based or free based market.

Panta and Bedari (2015) showed that foreign banks are less cost efficient relatively than medium and small banks. The entry of foreign banks enhanced competition which have forced banks to reduce cost, diversify products through innovation, provide better services to clients and to retain clients. Kunwar et al. (2014) found that bank size, age and deposits have a positive impact on the bank performance.

Rajbahak et al. (2014) showed that there is a significant impact of corporate governance on return on equity and return on assets in Nepalese commercial banks. The study also revealed that the board size, firm size and firm growth have positive and significant impact on return on assets but insignificant impact on return on equity. In the same way, foreign ownership, debt to equity and firm growth has insignificant impact on return on equity. Bhusal et al. (2015) found that the leverage has a positive relationship with the performance of the commercial banks. Similarly, the study also revealed that there is an insignificant impact of corporate governance on return on equity on commercial banks.

The major purpose of this study is to assess the relationship between ownership structure, risk and performance in Nepalese banking sector. Specifically, it examines the effect of ownership structure on risk and performance in Nepalese commercial banks.

The remainder of this paper is organised as follows: Section two describes the sample, data and methodology. Section three presents the empirical results and the final section draw conclusions and discuss the implications of the study findings.

## 2. Methodological aspects

The study is based on the secondary data, which were gathered for 24 commercial banks in Nepal from 2010/11 to 2014/15 leading to a total of 120 observations. The data are collected from various issues of Banking and Financial Statistics, Quarterly Economic Bulletin, Bank Supervision Report published by Nepal Rastra Bank and annual reports of the selected commercial banks.

Table 1 shows the number of commercial banks selected for the study along with the study period and number of observations.

**Table 1: Number of commercial banks selected for the study along with study period and number of observations**

S.N.	Name of commercial banks	Study period	Observations
<b>Foreign ownership banks</b>			
1.	Nabil Bank Limited (NIBL)	2010/11-2014/15	5
2.	Standard Chartered Bank Limited(SCBL)	2010/11-2014/15	5
3.	Everest Bank Limited(EBL)	2010/11-2014/15	5
4.	Himalayan Bank Limited(HBL)	2010/11-2014/15	5
5.	SBI Bank Limited(NSBI)	2010/11-2014/15	5
6.	Nepal Bangladesh Bank Limited(NBBL)	2010/11-2014/15	5
<b>Private ownership banks</b>			
7.	Nepal Credit and Commerce Bank Limited(NCC)	2010/11-2014/15	5
8.	Kumari Bank Limited(KBL)	2010/11-2014/15	5
9.	Laxmi Bank Limited(LXBL)	2010/11-2014/15	5
10.	Lumbini Bank LimitedLBL)	2010/11-2014/15	5
11.	Machhapuchchhre Bank Limited(MBL)	2010/11-2014/15	5
12.	Siddhartha Bank Limited (SBL)	2010/11-2014/15	5
13.	Nepal Investment Bank Limited(NIBL)	2010/11-2014/15	5
14.	Bank of Kathmandu Limited (BOK)	2010/11-2014/15	5
15.	Global IME Bank Limited(GIBL)	2010/11-2014/15	5
16.	Citizen Bank Limited(CBL)	2010/11-2014/15	5
17.	Century Commercial Bank Limited(CCBL)	2010/11-2014/15	5

18.	Sunrise Bank Limited(SUBL)	2010/11-2014/15	5
19.	Nepal Merchant Bank Limited(NMB)	2010/11-2014/15	5
20.	Janata Bank Limited(JBL)	2010/11-2014/15	5
21.	Sanima Bank Limited(SBL)	2010/11-2014/15	5
<b>Government and private ownership banks</b>			
22.	Agricultural Development Bank Limited (ADBL)	2010/11-2014/15	5
23.	RastiyaBanijya Bank (RBB)	2010/11-2014/15	5
24.	Nepal Bank Limited (NBL)	2010/11-2014/15	5
<b>Total no. of observations</b>			<b>120</b>

Thus, the study is based on a total of 120 observations.

## The Model

As a first approximation, this study assumes risk and profitability of the banks depends on ownership structure and banks specific variables. Therefore, the model takes the following form.

$$\text{Model 1: ROE} = \alpha_0 + \alpha_1 \text{GO} + \alpha_2 \text{FO} + \alpha_3 \text{PB} + \alpha_4 \text{LM} + \alpha_5 \text{LEV} + \alpha_6 \text{AGE} + \alpha_7 \text{SIZ} + \alpha_8 \text{Depo} + \epsilon$$

$$\text{Model 2:NIM} = \alpha_0 + \alpha_1 \text{GO} + \alpha_2 \text{FO} + \alpha_3 \text{PB} + \alpha_4 \text{LM} + \alpha_5 \text{LEV} + \alpha_6 \text{AGE} + \alpha_7 \text{SIZ} + \alpha_8 \text{Depo} + \epsilon$$

$$\text{Model 3:CR} = \alpha_0 + \alpha_1 \text{GO} + \alpha_2 \text{FO} + \alpha_3 \text{PB} + \alpha_4 \text{LM} + \alpha_5 \text{LEV} + \alpha_6 \text{AGE} + \alpha_7 \text{SIZ} + \alpha_8 \text{Depo} + \epsilon$$

Where,

ROE= Return on equity (defined as percentage of net income to shareholders equity).

NIM= Net interest margin (defined as the percentage of net interest income to total assets).

CR = Credit Risk (defined as percentage of nonperforming loan to total assets).

GO = Government ownership (defined as proportion of government ownership).

FO= Foreign ownership (defined as proportion of foreign ownership).

PO= Private ownership (defined as proportion of private ownership).

SIZE= Bank size (defined as natural logarithm of assets).

LM= Liquidity (defined as the percentage of liquid assets to total assets).

Lev= Leverage (defined as the percentage of total debt to total assets).

DEPO= Deposit (defined as the percentage of total deposit to total assets).

AGE= Age (defined as the age of bank since its establishment).

e = Error term

## **Government Ownership (GO)**

Government ownership banks refer to those banks whose shares are held by the government of the country. Ongore (2011) found that ownership concentration and government ownership have significant negative relationships with the bank performance. Shahid and Haq (2013) found that government ownership is positively associated to risk and negatively related to bank profitability. Based on it, this study develops the following hypothesis:

*H1: Government ownership is negatively related to profitability of banks.*

*H2: Government ownership is positively related to risk.*

## **Foreign ownership (FO)**

Foreign ownership bank refers to those organisations whose shares are held by the foreign entity or joint venture banks. Mody and Martinez (2004) showed that foreign banks in Latin American countries exhibit lower interest margins than domestic banks. Foreign ownership can boost market performance by offering a high level of financing, and the transference of their experience and knowledge to the market where they are investing (Gurunlu and Gursoy, 2010). Private firms seem to have lower performance with lower risk, while firms with foreign ownership display better performance (Kamau, 2009). Based on it this study develops the following hypothesis:

*H3: Foreign ownership is positively related to performance.*

*H4: Foreign ownership is negatively related to risk.*

## **Private ownership (PO)**

Private ownership bank refers to those organisations whose shares are held by the general public and private institutions of the country. There is a positive association between privately owned firms and firm performance (Che and Langli, 2015). Private ownership has a positive effect on firm profitability and growth, and a negative effect on firm valuation and risk (Chen, 2012). Verbrugge et al. (1999) analysed bank privatizations in 25 countries and concluded that there is improvement in bank profitability and operating efficiency after privatisation. Based on it this study develops the following hypothesis:

*H5: Private ownership is positively related to performance.*

*H6: Private ownership is negatively related to risk.*

## **Bank size (SIZE)**

Bank size refers to the log of total assets. Sufian (2011) found a positive impact of firm size on performance. Jonsson (2007) showed that bigger firms have higher profitability as compared to smaller firms. Lee (2009) revealed that firm size plays a remarkable role in explaining profitability. Athanasoglou et al. (2008) found that the effect of bank size on profitability is positive and significant statistically. Based on it, the study develops the following hypothesis.

*H7: Size is positively related to performance.*

*H8: Size is negatively related to risk.*

## **Liquidity (LM)**

Liquidity refers to the ratio of liquid assets to total assets. Liquidity management serves as an important determinant of commercial banks' profitability. Bourke (1993) revealed a positive relationship between banks level of liquidity risk and credit risk in the context of Europe, North

America and Australia. Similarly, Fungacova and Poghosyan (2011) found a significant positive relationship between bank's liquidity and profitability. Diamond and Raghuram (2000) opined that there is a negative relationship between liquidity and credit risk. Based on it, the study develops the following hypothesis.

*H9: Liquidity is positively related to risk.*

*H10: Liquidity is negatively related to performance.*

### **Leverage (LEV)**

It can be defined as the ratio of total debt to total assets expressed in percentage and can be interpreted as the proportion of a company's assets that are financed by debt (Sullivan and Spong, 2007). Yazdanfar and Ohman (2015) examined the effect of three different forms of debt ratios, i.e. trade credit, short-term debt, and long-term debt on profitability and found a negative relationship between all types of debts and profitability in Swedish SMEs. Jeon and Miller (2006) concluded that higher the debt ratio, the more leveraged the company and the greater its financial risk. Eunju & Soocheong (2005) found that firms with higher debt were less profitable. Based on it, this study develops the following hypothesis:

*H9: Leverage is negatively related to performance of bank.*

*H10: Leverage is positively related to risk.*

### **Bank age (AGE)**

It can be defined as a number of years that the bank has existed in the market since its establishment. The bank with longer existence has goodwill in the market and public have trust in those banks. Therefore, the banks perform better and have higher ROA and ROE (Glancey, 1998). As the firm grows older its size increases and size have a positive impact on performance as the banks have ability to diversify risk (Ghosh, 1998). Jonsson (2007) argued that younger firms are more difficult to monitor since there is no past record of performance. Based on it, this study develops the following hypothesis:

*H11: Bank age is positively related to bank performance and risk*

### **Deposit (DEPO)**

Deposit refers to the ratio of total deposit to total assets. There is positive relationship in between bank deposit and return on assets (Mody and Martinez, 2004). Sullivan and Spong (2007) supported the positive relationship between bank profitability and deposit collected from the general public. The study revealed that increase in bank deposit leads to increase in profitability of the banks (Kamau, 2009). Based on it, this study develops the following hypothesis:

*H12: Deposit is positively related to bank performance and risk.*

## **3. Results and discussion**

### **Descriptive statistics**

The descriptive statistics of dependent variables (return on equity, net interest margin and credit risk) and independent variables (government banks, foreign banks, private banks, bank size, leverage ratio, bank age, deposit and liquidity ratio) of the study are shown in Table 2.

**Table 2: Descriptive statistics**

(This table shows mean, standard deviation, minimum and maximum values of variables associated with 24 sample banks for the period of 5 years from 2010/11 to 2014/15. The independent variables are government ownership (GO in percentage) defined as proportion of government ownership, foreign ownership (FO in percentage) defined as proportion of foreign ownership, private ownership (PO in percentage) defined as proportion of private ownership, bank size (SIZE in percentage) defined as natural logarithm of assets, liquidity (LM in percentage) defined as the percentage of liquid assets to total assets, leverage (LEV in percentage) defined as the percentage of total debt to total assets, deposit (DEPO in percentage) defined as the percentage of total deposit to total assets, bank age (AGE in years) defined as the age of bank since its establishment. The dependent variables are return on equity (ROE) defined as percentage of net income to shareholders equity, net interest margin (NIM) defined as the percentage of net interest income to total assets, credit risk (CR) defined as percentage of nonperforming loan to total assets.)

Descriptive statistics				
Variables	Minimum	Maximum	Mean	Std. Deviation
GO	0	100	7.951	23.090
PO	0	100	81.663	28.289
FO	0	75	10.433	20.832
ROE	-361.316	102.37	12.491	37.421
NIM	0	0.040	0.012	0.012
Credit risk	0	0.144	0.014	0.021
Liquidity	0.032	0.361	0.154	0.065
Firm size	9.792	25.554	23.171	3.701
Leverage	0.945	108.751	85.943	18.644
Deposits	0.081	0.964	0.831	0.091
Bank age	1	78	19.582	16.473

Sources: SPSS output

### Correlation analysis

Having indicated the descriptive statistics, Pearson correlation coefficients are computed and the results are presented in Table 3.

**Table 3: Pearson's correlation matrix for Nepalese commercial banks**

(This table reveals the bivariate Pearson correlation coefficients between different pairs of ownership variables, risk variable and performance variables. The correlation coefficients are based on the data from 24 sample banks with 120 observations for the period of 5 years from 2010/11 to 2014/15. Government ownership (GO in percentage) defined as proportion of government ownership, foreign ownership (FO in percentage) defined as proportion of foreign ownership, private ownership (PO in percentage) defined as proportion of private ownership, bank size (SIZE in percentage) defined as natural logarithm of assets, liquidity (LM in percentage) defined as the percentage of liquid assets to total assets, leverage (LEV in percentage) defined as the percentage of total debt to total assets, deposit (DEPO in percentage) defined as the percentage of total deposit to total assets, bank age (AGE in years) defined as the age of bank since its establishment are independent variables. The dependent variables are return on equity

(ROE) defined as percentage of net income to shareholders equity, net interest margin (NIM) defined as the percentage of net interest income to total assets, credit risk (CR) defined as percentage of nonperforming loan to total assets.)

Variables	ROE	NIM	CR	GO	PO	FO	LM	SIZE	LEV	DEPO	AGE
<b>ROE</b>	1										
<b>NIM</b>	0.217	1									
<b>CR</b>	-0.128	-0.114	1								
<b>GO</b>	-0.097**	-0.159*	0.162*	1							
<b>PO</b>	-0.026*	0.357**	-0.051*	0.701**	1						
<b>FO</b>	0.146*	0.310*	-0.117	-0.179	0.576**	1					
<b>LM</b>	-0.076	0.022	-0.036	-0.096	-0.017	0.133	1				
<b>SIZE</b>	-0.064	0.025	0.122	0.456**	0.223*	0.215*	-0.111	1			
<b>LEV</b>	-0.130*	-0.144*	0.092*	0.749**	0.519**	0.143	0.075	0.646**	1		
<b>DEPO</b>	-0.058*	0.202*	-0.098	0.032	-0.048	0.066	0.262**	-0.076	0.073	1	
<b>AGE</b>	0.220*	0.233*	0.266**	0.743**	0.706**	0.123	-0.037	-0.013	0.232*	0.078	1

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

The table shows that there is positive relation of return on equity with foreign ownership and bank age. This indicates that an increase in foreign ownership and banks age leads to an increase in return on assets. However, government ownership, private ownership, liquidity, firm size, leverage and deposit are negatively related to return on equity which indicates that higher the government ownership, private ownership, liquidity, firm size, leverage and deposit, lower would be the return on equity.

The result also shows that foreign ownership, private ownership, liquidity, bank size, deposit and bank age are positively related to net interest margin which indicates that higher the foreign ownership, private ownership, liquidity, bank size, deposit and bank age, higher would be the net interest margin. However, the leverage and government ownership are negatively related to net interest margin which indicates that higher the leverage and government ownership, lower would be the net interest margin. The credit risk is positively related to government ownership, firm size, leverage and bank age which indicates that higher the government ownership, firm size, leverage and bank age, higher would be the credit risk. However, credit risk is negatively related to private ownership, foreign ownership, deposit and liquidity which indicates that higher the private ownership, foreign ownership, deposit and liquidity, lower would be the credit risk.

### Regression analysis

Having indicated the Pearson correlation coefficients, the regression analysis has been carried out and the results are presented in Table 4. More specifically, it shows the regression results of return on equity.

**Table 4 :Regression of GO, FO, PO, LM, LEV, AGE and SIZE on return on equity**

The results are based on data of 24 commercial banks with 120 observations for the period of 5 years from 2010/11 to 2014/15, by using linear regression model. The model is,  $ROE_{it} = \alpha_0 + \alpha_1 GO_{it} + \alpha_2 FO_{it} + \alpha_3 PB_{it} + \alpha_4 LM_{it} + \alpha_5 LEV_{it} + \alpha_6 AGE_{it} + \alpha_7 SIZE_{it} + \alpha_8 DEPO_{it} + \epsilon_{it}$ . The independent variables are government ownership (GO in percentage) defined as proportion of government ownership, foreign ownership (FO in percentage) defined as proportion of foreign ownership, private ownership (PO in percentage) defined as proportion of private ownership, bank size (SIZE in percentage) defined as natural logarithm of assets, liquidity (LM in percentage defined as the percentage of liquid assets to total assets, leverage (LEV in percentage) defined as the percentage of total debt to total assets, deposit (DEPO in percentage) defined as the percentage of total

*deposit to total assets, bank age (AGE in years) defined as the age of bank since its establishment. The dependent variable is return on equity (ROE) defined as percentage of net income to shareholders equity)*

M	Intercept	Regression coefficients of ROE							R <sup>2</sup>	F	SEE	
		GO	FO	PO	LM	SIZE	AGE	LEV				
1	-0.78 (-19.61)	-0.69 (-2.74)**							0.62	7.62	0.83	
2	1.78 (15.12)		0.16 (1.98)*						0.59	11.89	0.90	
3	-2.54 (-10.71)			-0.69 (-2.74)**					0.65	7.66	0.88	
4	2.22 (4.71)				0.04 (0.62)				0.34	9.43	0.91	
5	1.44 (1.01)					0.10 (0.33)			0.28	12.15	0.91	
6	1.325 (7.352)						0.03 (9.25)**		0.45	18.98	0.84	
7	1.545 (9.452)							0.04 (3.11)**	0.79	9.69	0.87	
8	-7.895 (-4.21)								-0.15 (-3.21)**	0.67	2.75	10.76
9	1.45 (9.72)	0.54 (-2.91)**						0.027 (3.39)*		0.72	11.88	0.87
10	2.10 (6.72)		0.27 (1.91)*	-0.65 (-3.91)**				0.21 (4.72)**		0.54	15.30	0.85
11	1.41 (7.55)		0.04 (2.27)*			0.16 (0.38)		0.31 (3.27)**		0.69	19.26	0.81
12	0.34 (3.52)	-0.82 (-3.15)**			0.07 (1.14)		0.06 (3.61)**			0.77	7.22	0.83
13	1.21 (1.22)		0.33 (2.14)*	-0.74 (-2.89)**	0.11 (1.31)			0.03 (4.24)**	-0.12 (-3.62)**	0.76	14.60	0.89
14	-1.32 (-4.11)		0.84 (1.91)*	-1.55 (-4.42)**	0.07 (0.97)	1.61 (0.15)		0.03 (4.29)**	-0.20 (-4.62)**	0.61	16.97	0.82

#### Notes:

1. Figures in parentheses are t- values.
2. The asterisk (\*) sign indicates that result is significant at 5% level and double asterisk (\*\*) sign indicates that result is significant at 1%.
3. Dependent variable is return on equity (ROE).

The table indicates that the beta coefficients are positive for foreign ownership, liquidity ratio, financial leverage ratio, bank size and bank age. Thus, the result indicates that higher the financial leverage ratio, higher would be the return on equity. This finding contradicts with the findings of Jeon and Miller (2006). Similarly, higher the foreign ownership and private ownership, higher would be the return on equity. This finding is consistent with the findings of Gurunlu and Gursoy (2010). Larger the bank size, higher would be the return on equity. This finding supports the findings of Jonsson (2007). Similarly, higher the bank's age, higher would be the return on equity. A positive relation between bank age and return on equity has been found. The finding is consistent with the findings of Glancey (1998). The beta coefficients are negative for the government ownership, private ownership and deposit. The result indicates that higher the government ownership, private ownership and deposit, lower would be the return on equity which is similar to the findings of Shahid & Haq (2013).

Table 5 shows the regression results of net interest margin on government ownership bank, foreign ownership bank, private bank, leverage, deposit, bank size, bank age and liquidity ratio of banks.

**Table 5: Regression of GO, FO, PO, LM, LEV, AGE and SIZE on net interest margin**

The results are based on data of 24 selected banks for the period of 5 years from 2010/11 to 2014/15, leading to 120 observations. The model is,  $NIM_{it} = a_0 + a_1 GO_{it} + a_2 FO_{it} + a_3 PO_{it} + a_4 LM_{it} + a_5 LEV_{it} + a_6 AGE_{it} + a_7 SIZE_{it} + a_8 DEPO_{it} + \epsilon_{it}$ . The independent variables are government ownership (GO in percentage) defined as proportion of government ownership, foreign ownership (FO in percentage) defined as proportion of foreign ownership, private ownership (PO in percentage) defined as proportion of private ownership, bank size (SIZE in percentage) defined as natural logarithm of assets, liquidity (LM in percentage defined as the percentage of liquid assets to total assets), leverage (LEV in percentage) defined as the percentage of total debt to total assets, deposit (DEPO in percentage) defined as the percentage of total deposit to total assets, bank age (AGE in years) defined as the age of bank since its establishment. The dependent variable is net interest margin (NIM) defined as the percentage of net interest income to total assets)

M	Intercept	Regression coefficients of NIM								$R^2$	F	SEE
		GO	FO	PO	LM	SIZE	AGE	LEV	DEPO			
1	-1.74 (-3.78)	-1.13 (-4.48)**								0.55	11.89	21.11
2	1.27 (0.79)		1.78 (0.32)							0.13	7.65	20.15
3	2.66 (15.61)			1.12 (4.36)**						0.52	9.42	21.01
4	3.44 (34.80)				0.08 (3.87)**					0.77	12.10	21.11
5	3.28 (19.10)					0.34 (1.49)				0.25	18.08	21.11
6	1.12 (2.60)						0.34 (2.25)*			0.63	17.19	20.11
7	16.661 (6.01)							0.12 (1.31)		0.63	11.52	21.10
8	-7.19 (-4.14)								-0.11 (-3.21)**	0.07	2.72	10.70
9	-15.18 (-2.68)	-1.25 (-5.43)**			0.27 (4.96)**					0.82	13.29	21.21
10	-2.68 (-15.33)	-1.67 (-3.12)**					0.46 (1.98)*	0.43 (1.25)		0.77	8.92	21.18
11	4.34 (2.61)			2.06 (3.45)**	0.43 (3.42)**		0.78 (2.21)*			0.70	13.52	20.86
12	-5.09 (-3.13)	-1.89 (-5.82)**				0.57 (1.09)	0.99 (1.98)*			0.68	21.29	20.98
13	-10.57 (-5.11)	-5.62 (-4.35)**		2.02 (4.07)**	0.87 (3.87)**			0.56 (0.92)		0.61	18.92	20.65
14	-19.42 (-1.81)	-3.30 (-2.70)**		-2.01 (-2.3)*	-0.12 (-2.41)*	-0.22 (-0.42)				0.19	2.50	5

**Notes:**

1. Figures in parentheses are t- values.
2. The asterisk (\*) sign indicates that result is significant at 5% level and double asterisk (\*\*) sign indicates that result is significant at 1%.
3. Dependent variable is net interest margin (NIM)

The table indicates that the beta coefficients are negative for government ownership and deposit. The result indicates that higher the government ownership, lower would be the bank's net interest margin. The finding is similar to the findings of Ongore (2011). The beta coefficients are positive for liquidity management ratio, bank age, bank size and financial leverage ratio, foreign ownership and private ownership. It indicates that higher the liquidity management ratio, higher would be the

net interest margin. Similarly, higher the age, higher would be the net interest margin. This finding is consistent with the findings of Fungacova and Poghosyan (2011). The result also indicates that higher the foreign ownership and private ownership, higher would be the net interest margin which is similar to the findings of Verbrugge et al. (1999). The beta coefficient for bank size is also positive indicating that larger the bank size, higher would be the net interest margin. The finding is similar to the findings of Akhavein et al. (1997). The beta coefficient for bank age is significant at 5 percent level of significance.

Table 6 which shows the regression results of credit risk on government ownership bank, foreign ownership bank, private bank, leverage, deposit, bank size, bank age and liquidity ratio of banks.

**Table 6**

**Regression of GO, FO, PO, LM, LEV, AGE and SIZE on credit risk**

The results are based on data of 24 selected banks for the period of 5 years from 2010/11 to 2014/15, leading to 120 observations. The model is,  $CR_{it} = \alpha_0 + \alpha_1 GO_{it} + \alpha_2 FO_{it} + \alpha_3 PO_{it} + \alpha_4 LM_{it} + \alpha_5 LEV_{it} + \alpha_6 AGE_{it} + \alpha_7 SIZE_{it} + \alpha_8 DEPO_{it} + \epsilon_{it}$ . The independent variables are government ownership (GO in percentage) defined as proportion of government ownership, foreign ownership (FO in percentage) defined as proportion of foreign ownership, private ownership (PO in percentage) defined as proportion of private ownership, bank size (SIZE in percentage) defined as natural logarithm of assets, liquidity (LM in percentage defined as the percentage of liquid assets to total assets), leverage (LEV in percentage) defined as the percentage of total debt to total assets, deposit (DEPO in percentage) defined as the percentage of total deposit to total assets, bank age (AGE in years) defined as the age of bank since its establishment. The dependent variable is credit risk (CR) defined as percentage of nonperforming loan to total assets).

M	Intercept	Regression coefficients of credit risk							R <sup>2</sup>	F	SEE	
		GO	FO	PO	LM	SIZE	AGE	LEV				
1	2.29 (6.65)	5.19 (4.76)**							0.54	6.80	23.81	
2	2.62 (-2.25)		0.321 (0.412)						0.03	4.13	0.10	
3	-3.76 (-7.68)			-2.14 (-2.85)**					0.45	4.00	8.41	
4	-3.23 (-0.24)				-0.15 (-0.34)				0.01	4.10	0.016	
5	-5.89 (-3.11)					-0.05 (-1.68)			0.01	4.02	3.08	
6	-3.65 (-4.73)						-0.06 (-1.34)		0.05	4.05	1.70	
7	-14.79 (-6.02)							-0.10 (-4.75)**	0.64	5.80	23.77	
8	-5.19 (-9.48)								-0.29 (-5.34)*	0.47	5.70	29.40
9	1.79 (4.21)	5.59 (5.12)**	1.12 (1.54)							0.45	5.70	13.30
10	-2.015 (-1.82)	5.39 (3.58)**	1.01 (0.78)	-0.21 (-0.24)						0.34	5.71	8.82
11	-46.33 (-3.18)	6.45 (4.94)**	1.00 (1.02)	-1.11 (-0.89)	-1.75 (-3.12)**					0.32	5.61	9.50
12	-46.21 (-3.25)	6.13 (4.01)**	1.00 (0.89)	-1.11 (-0.85)	-1.74 (-3.14)*					0.39	4.60	7.51
13	-52.63 (-3.51)	4.02 (2.97)*	0.86 (0.67)	-1.15 (-0.87)	-2.01 (-3.29)**	-0.02 (-0.16)	-0.69 (-1.6)			0.24	6.63	6.80
14	-44.12 (-3.12)	0.12 (0.17)	0.39 (0.38)	-0.58 (-0.65)	-1.12 (-2.01)*	-0.11 (-0.13)	-0.14 (-0.13)	-0.131 (-3.374)**	-0.45 (-9.23)**	0.26	5.50	8.01

**Notes:**

1. Figures in parentheses are t- values.
2. The asterisk (\*) sign indicates that result is significant at 5% level and double asterisk (\*\*) sign indicates that result is significant at 1%.
3. Dependent variable is credit risk (CR)

The table shows that the beta coefficients are positive for government ownership and foreign ownership. Thus, the results indicate that higher the government ownership and foreign ownership, higher would be the bank's credit risk. The finding is similar to the findings of Gursoy and Aydogan (2002). The beta coefficients are negative for private ownership, liquidity management ratio, bank age, bank size, financial leverage ratio and deposit. This indicates that higher the liquidity management ratio, lower would be the credit risk. This finding supports the findings of Diamond and Raghuram (2000). Similarly, the beta coefficients for bank size are negative which indicates that higher the bank size, lower would be the credit risk. This finding is similar with the findings of Berger et al. (2005).

#### **4. Summary and conclusion**

Banks have a very important function to play in economic operations of any country as financial intermediary. Profitability is the major reason behind every one to take greater amount of risk and make business successful. The choice of ownership such as foreign, local, public, private, state, etc. is crucial in the context of a bank. This study hypothesizes that the financial performance depends on government ownership, foreign ownership, private ownership, leverage, deposit, bank size, bank age and liquidity ratio.

The study shows that foreign ownership and bank age have positive impact on profitability of commercial banks in Nepal. However, government ownership and leverage have negative impact on the profitability of commercial banks. The study also shows that government ownership, firm size, leverage and bank age have positive and significant impact on credit risk of commercial banks in Nepal. The study further reveals that private ownership, foreign ownership, deposit and liquidity have negative impact on credit risk of banks. The study concludes that government ownership, foreign ownership, liquid ratio, bank size and deposit are the major factors affecting the profitability of commercial banks in Nepal. Similarly, government ownership, bank age, private ownership and financial leverage are the major variables determining the credit risk of Nepalese commercial banks.

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# Stock Return and Trading Volume Relation in Nepalese Stock Market: AN ARDL Approach

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## Abstract

*The relationship between stock returns and trading volume observed in this research is based on 149 monthly data (mid-July 2005 to mid-December 2017) of NEPSE index. The relationship between stock returns and trading volume is examined using Autoregressive Distributed Lag approach. The research investigated the long-run and short-run relationship between trading volume and stock returns. The study detected significantly positive relationship between trading volume and stock returns in both long as well as short run. Therefore, the research concludes that impact of stock returns on trading volume is significant in Nepalese stock market, indicates that market participants use volume as an introduction of stock returns. From investment perspective, the relationship between trading volume and stock returns is of great importance to individuals who invest in stock market instruments.*

**Keywords:** Trading volume, stock returns, ARDL approach

## 1. Introduction

Price and volume are two important components of every kind of economic equilibrium and these components are jointly determined by the same share market dynamics. Therefore, it is generally believed that these two components should have very close and straightforward relationship. Stock price and trading volume are two statistics that are routinely released in the media to report on the status of the financial markets and are closely observed by investors. Hence, market participants believe that intrinsic knowledge of price changes and trading volume will enhance their understanding of the market dynamics and thus their financial success. Due to some undesirable stochastic properties of stock price, especially non-stationarity, most studies concentrated on stock returns rather than prices. Stock returns and trading volume are two major pillars, around which entire stock market revolves. While return can be interpreted as the evaluation of new information, volume is an indicator to which, the investors disagree about this information. This will be the case if some investors interpret some bits of information as good news while other find it to be bad news. Therefore, price changes indicate the average reaction of investors to news. As it happens with stock returns, trading volume and its changes mainly reflect the available sets of relevant information perceived by market. Stock price are noisy which can't convey all information to market dynamic of stock returns. Karhoff (1987) recorded four reasons why the price-volume relationship is important: Firstly, the price-volume relationship provides insight into the structure of financial markets, Second, it is important for event studies that use a combination of price and volume data from which to draw inferences. Third, it is critical to the debate over the empirical

distribution of speculative markets, and finally, Price-volume relationships have significant implications for research into futures markets. The author argued on two sets of hypotheses that explain the information arrival process in financial markets, the mixture of distributions hypothesis and the sequential information arrival hypothesis. The study created the conclusions of early research into four empirical propositions:

- The correlation between volume and positive price changes is positive
- The correlation between volume and negative price changes is negative
- Tests using data on volume and the absolute value of price changes will yield positive correlations and heteroskedasticity error terms.
- Tests using data on volume and price changes per se will yield positive correlations.

Gallant, Rossi and Tauchen (1992) argue that more can be learned about the market by studying the joint dynamics of stock prices and trading volume than focusing only on the one-way dynamics of stock prices.

Literature found that there are positive relationship between stock returns and trading volume in most of studies conducted in developed countries (Llorente, Michaely, Saar and Wang, 2002). There were few studies have been conducted in the context of Nepalese stock sarket (Shrestha, 2011). These studies do not employ ARDL approach to find relationship between stock returns and trading volume. The ARDL cointegration technique is used in determining the long run relationship between series with different order of integration (Pesaran and Shin, 1999, and Pesaran et al. 2001). The ARDL result gives the short-run dynamics and long run relationship of the considered variables. The research attempts empirically to access the link between trading volume and stock returns using ARDL approach.

This objective of this study is to empirically examine the long-run as well as short-run relation between trading volume and stock returns for Nepalese stock market using ARDL procedure.

The rest of the paper is organised as follows: the next section discusses brief survey of empirical research on relationship between trading volume and stock returns. The section 3 highlights the methodology of the present research. This is followed by discussions on the results of the study in the section 4. Section 5 concludes the research work.

## 1 Review of Literature

This section summarises some empirical studies on the relationship between trading volume and stock returns. Majority of studies concluded positive relationship between stock returns and trading volume. The Table 1 provides summary of the major empirical studies.

**Table1: Major studies on relationship between trading volume (TV) & returns (RET)**

Author	Assets	Data period	Data interval	RET and TV
Granger and Morgenstern (1963)	NYSE, USA	1939-1961	Weekly	No relation
Godfrey, Granger and Morgenstern (1964)	Stock Market aggregates	1959-1962	Transactions, daily, weekly	No relation
Ying (1966)	S&P 500 index, NYSE, USA	1957-1962	Daily	Positive relation

<b>Author</b>	<b>Assets</b>	<b>Data period</b>	<b>Data interval</b>	<b>RET and TV</b>
Crouch (1970)	DJIA, S&P500, NYSE USA	1963-1967	Daily, hourly	Positive relation
Clark (1973)	Cotton futures, USA	1945-1958	Daily	Positive relation
Epps (1975)	20 NYSE bonds	Jan. 1971	transactions	Positive relation
Morgan (1976)	17 NYSE stock	1947-1968	Daily, monthly	Positive relation
Cornell (1981)	18-futures contracts of US exchange	1971-1979	Daily	Positive relation
James and Edmister (1983)	NYSE and AMEX	1975-1981	Daily	No relation
Tauchen and Pitts (1983)	T-bills futures contract of CME	1976-1979	Daily	Positive relation
Wood, McInish, and Ord (1985)	NYSE, USA	1971/9-1972/2, 1982	minute-to-minute	Positive relation
French and Roll (1986)	NYSE and AMEX	1963-1982	Hourly	Positive relation
Grammatikos and Saunders (1986)	5-countries foreign currency futures contracts	1979-1983	Daily	Positive relation
French, schwert and Stambaugh (1987)	S&P composite portfolio of NYSE	1928-1984	Daily	Positive relation
Richardson, Sefcik and Thompson (1987)	106 common stocks	1973-1982	Weekly	Positive relation
Jain & Joh (1988)	S&P 500 stock index	1/1979-12/1983	Hourly	Positive relation
Amihud& Mendelson (1991)	Tokyo Stock Exchange	Apr. to Nov., 1987	Daily	Positive relation
Mohamad and Nassir (1995)	KLSE	1985-1992	Daily	Positive relation
Moosa and Al-Loughani (1995)	4 emerging Asian Markets	1986-1993	Monthly	Positive relation
Brailsford (1996)	Australian Stock Market	1989-1993	Daily	Positive relation
Chordia and Swaminathan (2000)	CRSP NYSE/AMEX stock	1963-1996	Daily and Weekly	Positive relation
Llorente, Michaely,	NYSE and AMEX	1993-1998	Daily	Positive

<b>Author</b>	<b>Assets</b>	<b>Data period</b>	<b>Data interval</b>	<b>RET and TV</b>
Saar and Wang (2002)				relation
Karmakar (2007)	CNX Nifty	1990-2004	Daily	Positive insignificant relation
DeMedeiros and VanDoornik (2008)	Brazilian stock market (Bovespa)	2000-2005	Daily	low positive relation
Puri and Philippatos (2008)	Interest rate futures (ECU (IC), Japanese bond (IJ), Short Sterling (IL), and Euro Deutschemark (IU)) Currency futures (British Pound (BP), Japanese yen (JY), and Canadiandollar (CD))	1994-1996	15-min Interval	no relation
Al-Saad and Moosa (2008)	36 individual stocks of Kuwait Stock exchange	1995-2002	Daily	no relation
Pathirawasam (2008)	266 stocks of Colombo stock exchange	2000-2008	Monthly	Positive relation
Mubarik and Javid (2009)	Pakistan stock market	1998-2008	Daily	Positive relation
Ning and Wirjanto (2009)	6 East Asian equity markets	1983-2007	Daily	Positive relation
Dumitriu, Stefanescu and Nistor (2011)	Bucharest Stock Exchange	2002-2011	Daily	positive relation
Habib (2011)	26 individual stocks of Egyptian securities exchange	1998-2005	Daily	no relation
Mehrabanpoor, Bahador and Jandaghi (2011)	Tehran Stock Exchange	2003-2009	Monthly	Positive relation
Ugwu, Sule and Emerole (2011)	10 firms of Nigerian banking sector	2004-2007	Daily	no relation
Chen (2012)	S&P 500 price index	1973-2008	Monthly	negative for bear market and positive for bull market
El-Ansary and Atuea (2012)	26 companies of Egyptian stock market	2001-2010	Daily	Positive relation
Abdeldayem and	167 stocks of Egyptian	2006-2011	Daily	Positive

<b>Author</b>	<b>Assets</b>	<b>Data period</b>	<b>Data interval</b>	<b>RET and TV</b>
Mahmoud (2013)	Stock exchange			relation
Abdullahi, Kouhy and Muhammad (2014)	West Texas Intermediate and Brent Crude oil futures markets	2008-2011	Daily	no relation
Hussain, Jamil, Javed and Ahmed (2014)	Karachi Stock Exchange	2012-2014	Daily	Positive relation
Habibou (2016)	8 African Stock Market	2004/2-2012/11	Daily	Positive relation

*Source: Authors' compilation*

In nutshell, on the basis of above-mentioned studies it can be stated that the significant efforts have been made at the international level to evaluate trading volume and stock return, whereas in Nepal, the relationship between stock returns and trading volume using OLS approach has been investigated in Nepalese stock market during 2001 to 2009 by Shrestha (2011) and found significantly positive relationship between these two variables. The relationship between stock returns and trading volume using ARDL approach has not been investigated in Nepalese Stock Market. Therefore, the current study is an attempt to fill this gap and sheds light on the relation between trading volume and stock returns of Nepalese stock market. This paper examines the long-run as well as short-run relationship between stock returns and trading volume in the context of Nepalese stock market and the research work contributes to the literature of stock market study of the Nepalese stock market.

## 2 Data and Methodology

This section describes the methodology followed to test the relationship between stock returns and trading volume in Nepalese stock market: (i) nature and sources of data, (ii) selection of enterprises, (iii) the variables, and (iv) methods of analysis and (v) the limitations of the study.

### 2.1 Nature and Sources of Data

The relationship between trading volume and stock returns are examined based on trading volume and stock price data series obtained from published monthly trading report of Nepal stock market. The stock market data related to maximum price, minimum price, opening price, average price, closing price, and amount of trading volume collected from annual trading report of Nepal Stock Exchange (NEPSE) and, official website of NEPSE. The data set used in this study comprises monthly closing prices, maximum price, minimum price and traded amount in NEPSE. The study period covers 12 years, ranging from mid-July 2005 to mid-December 2017 thereby making 149 months. The monthly stock price and trading volume data set are available since mid-July 2005 onward. Both series are expressed in the local currency.

### 2.2 Selection of enterprises

The study uses overall market index of Nepalese stock market. The study also considers sector wise data of Nepalese stock market.

### 2.3 Variables specification

The study considers monthly trading volume series and the stock return series to examine the relationship between trading volume and stock returns.

**Stock returns:** The study considered changes in monthly price index as stock returns. A monthly price index change is calculated using the natural log of the ratio of a stock's price index (P) from the current month (t) to the previous month (t-1) as:

$$R_t = \text{monthly stock returns} = \ln\left(\frac{P_t}{P_{t-1}}\right) \times 100, t=1,2,\dots,149$$

Where,  $P_t$  represents the closing price index for the period t; t is the time in months.  $P_{t-1}$  is the closing price index for the period of t-1;  $\ln(.)$  is the natural logarithm operator. All returns are expressed in percentage and are not adjusted for dividends.

**Trading volume:** This study uses the total value traded of the shares as the measure of trading volume because it takes into account of the relative market value of shares. Trading volume and stock returns series should be in the same form: since the return is using percentage form, trading volume should be in the percentage form too. Thus, following Pisetsasalasai and Gunasekaran, 2007, the form of trading volume has been formulated as follows.

$$V_t = \text{monthly trading volume} = \ln\left(\frac{V_t}{V_{t-1}}\right) \times 100, t=1,2,\dots,149$$

This form of trading volume was also used by Osei-Wusu (2011) to analyse the relationship between return, volume and volatility in the Ghana stock market.

## 2.4 Methods of analysis

The primary objective of the research is to examine the long-run as well as short-run integrating relationship between trading volume and stock returns in Nepalese stock market. Based on the review of previous empirical studies, the study examined the relationship between trading volume and stock returns, this study specifies the following form of model for estimation:

$$V_t = f(R_t)$$

To empirically analyse the above functional form, the ARDL model specification is used to show the long-run relationships and dynamic interactions between trading volume and stock returns using ARDL bound test in Nepalese stock market. This method is adopted for this study for three reasons. Firstly, compared to other multivariate cointegration methods (i.e. Johansen and Juselius (1990), the bounds test is a simple technique because it allows the cointegration relationship to be estimated by ordinary least square method once the lag order of the model is identified. Secondly, adopting the bound testing approach means that pretest such as unit root is not required. That is the regressor can either I (0), purely I (1) or mutually cointegrated. Thirdly, the long-run and short-run parameters of the models can be simultaneously estimated. Therefore, Autoregressive Distributed Lag bound test proposed by Pesaran et al. (2001) has been used to show the relationship between trading volume and stock returns in NEPSE from mid-July, 2005 to mid-December 2017.

The ARDL model specifications of the functional relationship between trading volume and stock returns is:

$$\Delta V_t = c + \gamma_0 V_{t-1} + \gamma_1 R_{t-1} + \sum_{i=1}^k b_1 \Delta V_{t-i} + \sum_{i=1}^k b_2 \Delta R_{t-i} + \varepsilon_t$$

Where,  $V_t$  and  $R_t$  are stationary trading volume and stock returns respectively, k is lag length for the unrestricted Error-correction model (UECM) and  $\varepsilon_t$  is a white noise disturbance error term.

The first step in the ARDL approach is to estimate Equation (2) using the ordinary least square (OLS). The second is to trace the presence of cointegration by restricting the coefficients of lagged level variables estimated in equation (1) to be equal to zero. The null hypothesis is that there is no cointegration ( $H_0: \gamma_0=\gamma_1=0$ ) against the alternative hypothesis of there is cointegration ( $H_A: \gamma_0 \neq \gamma_1 \neq 0$ ).

Accordingly, the computed F-statistic derived from the Wald test is then compared to the non-standard critical bounds values reported by Pesaran et al. (2001). If the computed F-statistic exceeds the critical upper bounds value, then the null hypothesis of no cointegration is rejected. If the computed F-statistic falls below the critical lower bounds value, then the alternative hypothesis of there is cointegration is accepted. However, in a situation where the computed F-statistic falls between the critical lower and upper bounds values, the order of integration of the variables under consideration is needed or else, meaningful conclusion cannot be reached about cointegration status.

Once cointegration relationship is established, the next step is to estimate the long-run coefficients using the ARDL approach and the short-run dynamic parameters using the error correction model and also selecting the orders of the model using the Akaike Information Criteria (AIC). The error correction model helps to capture the speed of adjustment among the variables affecting trading volume and stock returns. The co-integrating long-run relationship was estimated using the specification below:

$$V_t = c + \gamma_0 V_{t-1} + \gamma_1 R_{t-1} + \varepsilon_t$$

The short-run dynamic model is specified thus:

$$\Delta V_t = c + \sum_{t=1}^k b_1 \Delta V_{t-i} + \sum_{t=1}^k b_2 \Delta R_{t-i} + b_3 ECT_{t-i} + \varepsilon_t$$

Where:  $ECT_{t-i}$ = the error correction term lagged for one period and  $b_3$ = the coefficient for measuring speed of adjustment in equation (4).

#### 2.4.1 Unit root test

Unit root test has a crucial importance in the time series analysis to choose the techniques and procedures for further analysis and modeling of time series. The presence of unit root shows the time series is non-stationary. A series with unit root suffers spurious results in regression analysis. For this purpose, the study uses the well-known Dickey-Fuller or the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981), Phillips-Perron (PP) unit roots and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test of stationary are employed. Two variants of this model are estimated: (i) one that includes only a constant term ( $\alpha$ ) as the deterministic regressor and (ii) the other that includes both constant ( $\alpha$ ) and time trend ( $t$ ) terms as deterministic regressor. ADF unit root test is sensitive towards the lag length included in the regression equation. So, the lag lengths have chosen based on Akaike Information Criterion (AIC). The respective models estimated took the following form:

$$\text{ADF Test (with constant) Model: } \Delta y_t = \alpha_0 + \gamma y_{t-1} + \sum_{i=1}^p \beta_i \Delta y_{t-i} + \varepsilon_t$$

$$\text{PP Test (with constant) Model: } \Delta Y_{t-1} = \alpha_0 + \gamma_1 Y_{t-1} + \varepsilon_t$$

$$\text{KPSS Test (with constant) Model: } y_t = \alpha_0 + \mu_t + \varepsilon_t$$

#### 2.5 Limitations of the study

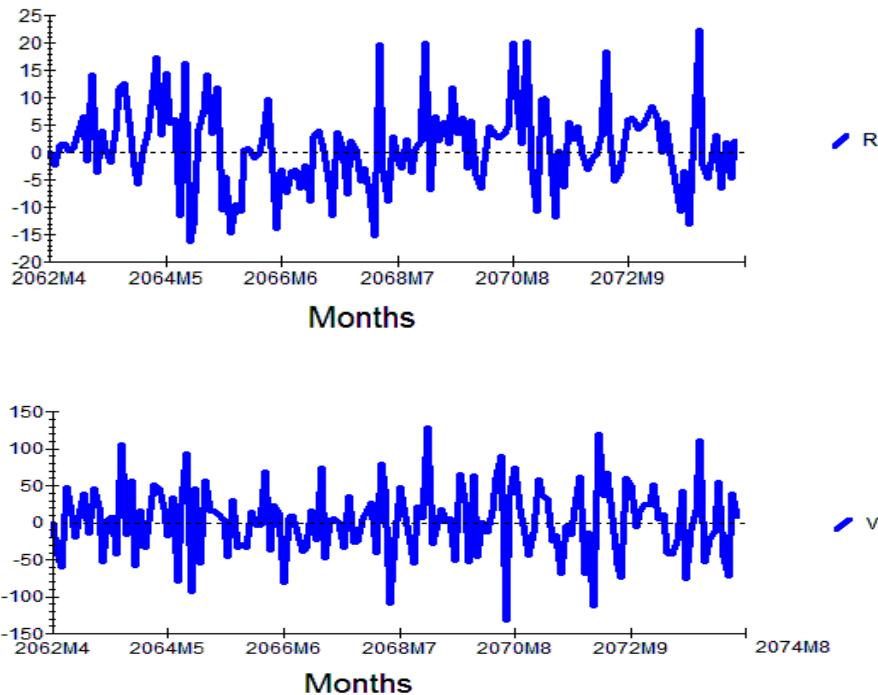
There are a large number of non-listed companies contributing to the dynamics of Nepalese economy; they are not included in the study due to data problems. The results relating to relation between stock returns and trading volume in this study are based on ARDL using available monthly stock returns and trading volume data series of Nepalese stock market.

### 3 Result and Discussions

#### 3.1 Descriptive statistics

Figure 1 shows the graphic display of NEPSE stock returns as well as NEPSE trading volume for the period of mid-July 2005 to mid-December 2017. It can be seen from Figure 1 that NEPSE stock return and trading volume series seem stationary because both series move around its mean value.

**Figure 1: NEPSE stock return vs trading volume (Mid-July 2005 to Mid-December 2017)**



*Source: Authors' calculation using Microfit 4.0 software*

Table 2 displays descriptive statistics and correlation analysis for the stock returns and trading volume series. The analysis shows that mean value of monthly stock returns is 1.09% with standard deviation of 7.69%, positive skewness, and excess kurtosis. Jarque-Bera statistic of stock returns suggests normality of stock returns. The descriptive statistics for trading volume shows that mean value is 2.43% with standard deviation of 47.48%. Skewness is negative, excess kurtosis and Jarque-Bera statistic of trading volume suggest normality of trading volume data. Table 2 also shows positive and significant correlation between trading volume and stock returns.

**Table2: Descriptive statistics and correlation analysis**

Descriptive statistic	R	V	Normality test	R	V
Mean	1.0964	2.4352	Doornik-Hansen test	3.3272	0.5358
Std. Dev.	7.6982	47.4819	Shapiro-Wilk W test	0.9778	0.9961
Skewness	0.3347	-0.0202	Lilliefors test	0.0836***	0.0426
Kurtosis	3.3742	3.1018	Jarquw-Bera test	3.6263	0.0739
Corr (R,V)	0.3547 (0.000)				

*Source: Authors' calculation using eviews 9 software and Gretl software*

The Jarque–Bera test is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution. The test results cannot be rejected the null hypothesis that stock return and trading volume data series are come from a normal distribution. Similarly, the Shapiro–Wilk test tests the null hypothesis that a sample came from a normally distributed population. The test statistics of stock returns and trading volume series suggests the null hypothesis cannot be rejected, there is evidence that the data came from a normally distributed population cannot be rejected; in other words, the data are normally distributed. The Doornik–Hansen test for normality also shows similar result as it cannot reject null hypothesis.

### 3.2 Unit root test

Table 3 presents the results of unit root test for NEPSE stock returns and trading volume using ADF, PP and KPSS approach. Unit roots test is particularly important for the trading volume since any test of correlation between trading volume and stock returns. As Table 3 shows, the both series do not contain the unit roots at level [I(0)] and first differences[I(1)].

**Table3: Unit Root Test Results**

Variable	Lag	ADF	PP	KPSS
R: I(0)	0	-10.5640***	-10.6019***	0.1471
I(1)	10	-6.7674***	-55.6597***	0.0474
V: I(0)	3	-8.6051***	-19.9415***	0.1166
I(1)	12	-7.1956***	-77.3805***	0.2441

*Source: Authors' calculation using eviews 9 software*

### 3.3 ARDL Model

Table 4 presents the results of ARDL model for relationship between trading volume and stock returns for NEPSE monthly data series. The model selected by AIC is ARDL (4, 1). All coefficients are statistically significant at 1% level of significance. The coefficient of stock returns shows significantly positive which confirms the positive relationship between trading volume and stock returns. It also passes all the diagnostic tests against serial correlation (Durbin Watson test and Breusch-Godfrey test) and heteroscedasticity (White Heteroskedasticity Test). The Ramsey RESET test also suggests that the model is well specified.

**Table4: Autoregressive Distributed Lag Model Results**

ARDL (4, 1) selected based on Akaike Information Criterion

\*\*\*\*\*

Dependent variable is V

145 observations used for estimation from 2062M8 to 2074M8

\*\*\*\*\*

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
V (-1)	-.55216	.079874	-6.9129[.000]
V (-2)	-.36054	.075765	-4.7587[.000]
V (-3)	-.31048	.072382	-4.2895[.000]
V (-4)	-.16788	.071495	-2.3481[.020]
R	2.5155	.41136	6.1152[.000]
R (-1)	1.9780	.46065	4.2940[.000]

\*\*\*\*\*

R-Squared	.38563	R-Bar-Squared	.36354
S.E. of Regression	37.8293 17.4500[.000]	F-stat.	F (5, 139)
Mean of Dependent Variable	2.8299	S.D. of Dependent Variable	47.4178
Residual Sum of Squares	198916.6	Equation Log-likelihood	-729.4794
Akaike Info. Criterion	-735.4794	Schwarz Bayesian Criterion	-744.4096
DW-statistic	2.0852		

## Diagnostic Tests

\*\*\*\*\*

* Test Statistics	LM Version	F Version
A: Serial Correlation 1.1681[.313]	CHSQ (12) = 14.4127 [.275]	F (12, 127) =
B: Functional Form	CHSQ (1) = 2.4343 [.119]	F (1, 138) = 2.3563 [.127]
C: Heteroscedasticity	CHSQ (1) = .53118 [.466]	F (1, 143) = .52578 [.470]

\*\*\*\*\*

A: Lagrange multiplier test of residual serial correlation;

B: Ramsey's RESET test using the square of the fitted values;

C: Based on the regression of squared residuals on squared fitted values.

Source: Authors' calculation using Microfit 4.0 software

### 3.4 ARDL bound test

Table 5 presents the results of the bound test for equation (2).

### 5: ARDL Bound test Results

K (lag length)	1
Computed F-Statistic	78.06896
1% critical bound Value	
I(0)	6.84
I(1)	7.84
5% critical bound Value	
I(0)	4.94
I(1)	5.73
10% critical bound Value	
I(0)	4.04
I(1)	4.78

*Source: Authors' calculation using eviews 9 software*

As Table 3 shows, the computed F-statistics is 78.07 which exceeds the upper bounds critical value of 7.84 at 1% level of significance. Hence, this implies that trading volume and stock returns are co-integrated.

After verified the variables are co-integrating each other, the study estimates equation (3) to show the long run relationship between trading volume and stock returns.

### Table6: ARDL long run relationship Results

ARDL (4,1) selected based on Akaike Information Criterion

\*\*\*\*\*

Dependent variable is V

145 observations used for estimation from 2062M8 to 2074M8

\*\*\*\*\*

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
R	1.8793	.24268	7.7441[.000]

\*\*\*\*\*

*Source: Authors' calculation using Microfit 4.0 software*

The result of the long - run relationship between trading volume and stock return in Table 6 reveals that the estimated coefficient of stock returns has a positive and significant impact on trading volume.

**Table7: ARDL Error correction Model Results**

ARDL (4, 1) selected based on Akaike Information Criterion

\*\*\*\*\*

Dependent variable is dV

145 observations used for estimation from 2062 M8 to 2074M8

\*\*\*\*\*

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
dV1	.83890	.15878	5.2834[.000]
dV2	.47836	.11592	4.1266[.000]
dV3	.16788	.071495	2.3481[.020]
dR	2.5155	.41136	6.1152[.000]
ecm(-1)	-2.3911	.20540	-11.6408[.000]

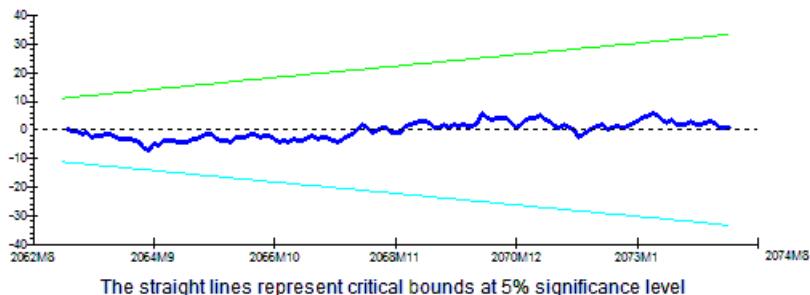
R-Squared	.74912	R-Bar-Squared	.74009
S.E. of Regression	37.8293	F-stat. F( 4, 140)	103.7605[.000]
Mean of Dependent Variable	-.27774	S.D. of Dependent Variable	74.2025
Residual Sum of Squares	198916.6	Equation Log-likelihood	-729.4794
Akaike Info. Criterion	-735.4794	Schwarz Bayesian Criterion	-744.4096
DW-statistic	2.0852		

*Source: Authors' calculation using Microfit 4.0 software*

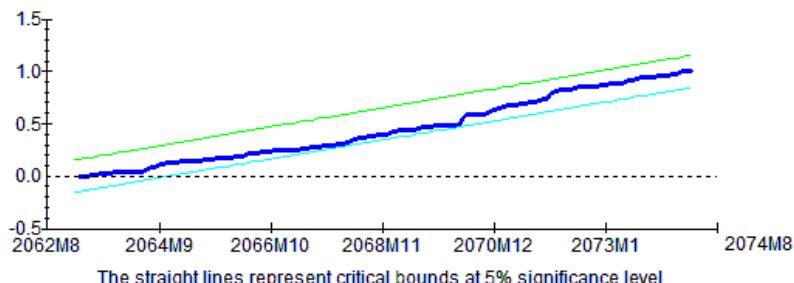
The result of above Table7 displays that the error correction coefficient estimated at -2.3911(0.000) is statistically significant, has correct sign and suggests a moderate speed of convergence to equilibrium. This implies that there is a long run causal relationship between trading volume and stock returns. The result also shows that at a significance level of 1%, a change in one period lagged value of trading volume has a positive and statistically significant effect on changes in stock returns. This means that the stock returns of a previous month, has a positive influence on the changes noticed in trading volume in the current month. Although, the one period lagged value of trading volume is positive, but it is statistically insignificant.

It is necessary to check for the stability of the stock return function. This is because of the importance of the stability of the stock return function for investor to know when to invest and the major factors affecting their portfolio investment. Therefore, it necessary to test whether the estimated stock return ARDL equation has shifted over time. As can be observed from Figure 2, the CUSUM and CUSUMSQ parameter stability tests indicate that the parameters are Table during the sample period (2005-2017). The results indicate the absence of any instability of the coefficients because the plot of the CUSUM and CUSUMSQ statistic fall inside the critical bands of the 5% confidence interval of parameter stability.

**Figure 2: CUSUM Plot and CUSUMSQ Plot**  
**Plot of Cumulative Sum of Recursive Residuals**



**Plot of Cumulative Sum of Squares of Recursive Residuals**



*Source: Authors' calculation using Microfit 4.0 software*

#### 4 Conclusion

The primary objective of this study was to test the relationship between trading volume and stock returns in Nepalese stock market for the period of mid-July 2005 to mid-December 2017 using monthly data series. This study adopted the ARDL bounds testing co-integration approach to investigate the long run and short run dynamics between trading volume and stock returns. The results show that there is a co-integration relationship between trading volume and stock returns. The results also indicate that stock returns has a positive and significant effect on trading volume. Therefore, the research concludes that impact of stock returns on trading volume is significant in Nepalese stock market, indicates that market participants use volume as an introduction of stock returns. From investment perspective, the relationship between trading volume and stock returns is of great importance to individuals who invest in stock market instruments and its relationship with price, having important implications on trading, speculation, forecasting and finally on hedging activities.

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# Factors affecting stock index in Nepal

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## Abstract

*This paper empirically examines the factors affecting the stock market index in Nepal using monthly data for the period of mid-August 2000 to mid-July 2017. The impact of major changes in politics and Nepal Rastra Bank's policy on lending against share collateral and paid up capital has also been assessed. Both simple OLS and ARDL Bound testing approach have been applied for empirical examination. Empirical results obtained from OLS estimations of behavioural equations reveal that the Nepal's stock index is found to respond positively to broad money growth, and negatively to interest rate. This suggests that availability of liquidity and the low interest rates stimulate the stock index. On the other hand, ARDL method confirms the existence of long run cointegration of stock index with consumer price index, broad money and interest rate. The stock index has positive association with inflation and negative association with broad money and interest rate. More importantly, stock index has been found to respond significantly to changes in political environment and the policies of Nepal Rastra Bank about lending against share collateral and partly to paid-up capital hike. Still, large chunk of fluctuation in share index is not explained by the models, indicating the ample role of news, rumours and speculations. These findings are helpful to understand the behaviour of Nepalese stock market and design policies for market stabilisation.*

**Key Words:** Stock Market, Macro Variables, Nepal

**JEL Classification:** G10, E44

## I. Background

Capital markets play a very important role in the economy for mobilising resources needed for investment. The stock market (also called share market) is one of the very important segment of capital market, through which long term funding can be mobilised. Daily trading of shares in stock market provides the liquidity for investors when needed despite of its long term nature of investment. Share market normally remains volatile and dynamic since its prices change at a very high frequency. Hence, change in share index, which is the aggregate index of prices of shares of various companies traded, draws a lot of attentions in news media worldwide. It is considered as a barometer of the health of any economy and it is a matter of interest to understand the factors underpinning the dynamics of stock index.

The history of stock market is not long in Nepal. Securities Exchange Centre (SEC) was established in 1976 with an objective of facilitating and promoting the growth of capital market (Gurung, 2004). However, it opened its floor for secondary trading of shares only in 1981, which was only for government bonds (NRB, 1996). With enactment of Securities Exchange Act 1983, SEC opened its floor for corporate share trading also, but it was very limited. The organised and

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full-fledged stock market began with the conversion of Securities Exchange Centre into Nepal Stock Exchange (NEPSE) Limited in 1993. The NEPSE opened its trading floor in the beginning of 1994. Till now, it is the only stock exchange in Nepal. Hence, the stock market in Nepal is still in evolving stage but of special interest as it has grown significantly since the start of its organised development. NEPSE was established in order to help mobilise long term funds through capital markets alternative to traditional banking sector for promoting economic growth and development in the country. Within a short period of time since its inception, the NEPSE index witnessed significant ups and downs. It has drawn the interest of a lot people because of which the number of investors has expanded substantially.

Growth in the stock index is normally considered as a good sign since it implies the investors are confident about the future prospect of the economy. It helps promote investment in the economy. However, a rapid increase or decrease in the stock market index is always a matter of concern, which can lead to financial instability. If the increase in the index is not justified by the fundamentals, such a rise cannot sustain and eventually the index will plummet endangering the economic and financial stability. Hence, it is essential that the policymakers keep eyes on the stock market development and be ready to take appropriate measures, if needs arise, to prevent the build up of bubbles and collapse in the market. For this, it is necessary to understand the relationship between the stock market index and the factors that influence it.

Several factors may affect the stock market. Any factors that have an effect on cash flows of firms or discount rate will have impact on the stock market. However, which factors affect to what degree will vary from country to country, depending on the size, type and other characteristics of the economy and the share market. In this context, this paper aims to determine the factors behind the fluctuation of NEPSE index by using monthly data for the period of mid-August 2000 through mid-November 2017. In addition to macroeconomic variables, this paper also assesses the impact of changes in politics and Nepal Rastra Bank's policy on lending against share collateral as well as policy of increasing paid up capital requirement. It is expected that the findings of this study would provide some meaningful insights to understand the determinants of the NEPSE index, useful for both policymakers and investors.

There are a lot of research studies on the determinants of stock market in other countries such as Asprem (1989), Yosuf and Majid (2007), Rahman et al. (2009), Singh (2010), Hsing (2011, 2014), Eita (2012), Quadir (2012), Naik and Padhi (2012), Jauhari and Yadav (2014), and Khan (2014). A very few studies have been done on the Nepalese stock market such as Dangol (2008, 2010), Pradhan and KC (2010), Bhatta (2010), Regmi (2012) and Shrestha and Subedi (2014). Many studies focused on micro perspective rather than macro and policy perspectives. This study differs from them since we have examined the impact of macroeconomic variables as well as politics and NRB's policy changes on the stock index. This paper is an update and extension of paper written by Shrestha and Subedi (2014) in terms of extension of sample period, addition of a new dummy variable and application of new methodology.

The rest of the paper is organised as follow. Section 2 presents the glimpse of the Nepalese stock market, which is followed by the review of literature in section 3. Section 4 describes the data and methodology used and section 5 presents the empirical results and discussion. Finally, Section 6 concludes the study.

## II. Glimpse of the Nepalese stock market

The Nepalese stock market is still in infant stage. However, there has been some progress. In the last two decades, the number of listed companies at NEPSE has increased from 79 in 1995 to 237 in 2014, but declined to 208 as of mid-July 2017 because of merger and acquisition of banks and financial institutions (BFIs). During the same period, market capitalisation has increased from 5.9 percent to 71.4 percent of GDP (Table 1). The growth in the listed companies mostly includes BFIs that were opened with the adoption of financial liberalisation policy. Existing regulations require BFIs to publicly float at least 30 percent of shares and get listed in the stock exchange within a specific period of time.

**Table 1: Glimpse of the Nepalese stock market**

Year	No. of listed companies	Market Capitalisation ( <i>Rs in million</i> )	Market Capitalisation/GDP (percent)
1995	79	12963	5.9
2000	110	43123	11.4
2005	125	61366	10.4
2010	176	376871	31.6
2014	237	1057166	54.8
2017	208	1856829	71.4

*Source: NRB (2017a) and NRB (2017b)*

However, there is no such a mandatory requirement for companies in the real sector. As such, very few real sector companies have been listed in the stock market. As of mid-July 2017, there were 165 (79.3 %) financial institutions out of 208 listed companies at NEPSE (Table 2). Similarly, BFIs contributed to 69.49 percent of the total market capitalisation followed by insurance companies (15.9 percent) and hydropower (4.2 percent). Market capitalisation of manufacturing and processing firms remained just at 2.3 percent. In recent years, there is one positive development is that the number of hydropower companies listed in NEPSE has been increasing. Such a listed hydropower companies reached 14 as of mid-July 2017.

**Table 2: Structure of the Nepalese stock market**

*(Mid-July 2017)*

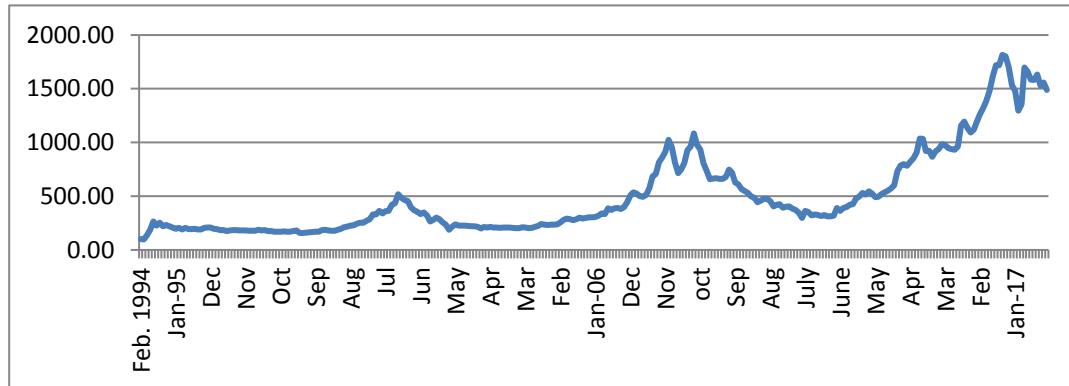
Type of Institution	Number	Market Capitalisation (%)
<b>Banks and Financial Institutions</b>	143	69.5
<b>Insurance Companies</b>	22	15.9
<b>Manufacturing &amp; Processing</b>	18	2.3
<b>Hotel</b>	4	1.6
<b>Trading</b>	4	0.07
<b>Hydro Power</b>	14	4.2
<b>Others</b>	3	6.5
<b>Total</b>	208	100.0

*Source: Current Macroeconomic Situation of Nepal (2013/14), NRB*

As regards the movement of the NEPSE index, it hovered around 200 points between 1994 and 1999. This was also the period when Nepalese stock market was evolving in terms of number of listed companies and the market capitalisation. From 2000 onwards, the NEPSE index was observed a greater fluctuation. In Figure 1, we can see the NEPSE reached peak three times in the

past such as in November 2000, December 2007 and August 2008 before taking a sharp plunge. On July 27, 2016, the NEPSE index again reached 1881.45, points which is all time high so far, before declining thereafter. What factors can explain such a up and down movement of the NEPSE is a matter of study in this paper.

**Figure 1: NEPSE index (mid-month, Feb 1994 to Nov. 2017)**



Source: [www.nepalstock.com.np](http://www.nepalstock.com.np)

### III. Review of literature

There is no dearth of literature on stock market since it has drawn a lot attention of researchers and academicians. The stock market is very old market in advanced countries playing important role of mobilising long term capital in the economy. However, share prices change day to day in the secondary market. Several factors can affect the prices of share of each company, thereby stock index in the share market. Some of the studies directly related to stock price determination are reviewed here.

The Arbitrage pricing theory, introduced by Ross (1976), establishes the theoretical framework to link stock returns with several variables which can influence the source of income volatility (Rahman, et al. 2009). Mukherjee and Naka (1995) argues that economic variables influence stock market returns through their effects on future dividends and discount rates. Macroeconomic variables selected to examine the determinants of stock market tend to differ slightly across studies, however (Rahman, et.al. 2009). Most common variables are the rate of inflation, money growth, interest rates, industrial production and exchange rates for explaining the stock market movement. Selection of these macroeconomic variables has theoretical justifications.

Inflation is also an important variable that investors consider before making any investment decisions. Theoretically, Asprem (1989) put forward that inflation should be positively related to stock return if stocks provide a hedge against inflation. This is based on Fisher (1930) who posits that stock markets are independent of inflation expectations since equities are a claim against real assets of the company. Fama (1981) however, disagrees with the generalised Fisher hypothesis on the basis that an increase in inflation causes uncertainty and reduces future economic activity, which reduces the stock price.

In case of money supply, Mukherjee and Naka (1995) argue that if an increase in money supply leads to economic growth, stock prices would benefit from expansionary monetary policy. In another way, with increase in money supply, the availability of liquidity at a lower interest rate

increases, which can flow into the stock market. In contrast, Fama (1981) argues that an increase in money supply leads to inflation (or expected inflation) in the economy, which in turn increases the discount rate and lowers the stock market returns.

Moreover, higher interest rates or discount rates would reduce the present value of cash flows, which would reduce the attractiveness of investment, hence, shrinks the value of stock returns (Rahman, et al. 2009). Another impact could be through portfolio substitution, a rise in the rate of interest increases the opportunity cost of holding cash, which later on leads to a substitution effect between stocks and other interest bearing securities like bonds (Rahman, 2009, p.98). In the literature, the common interest rate proxies are the treasury bills rates as employed by Mukherjee and Naka (1995), Ratanapakorn and Sharma (2007), Yusof and Majid (2007), and Eita (2012)<sup>1</sup>.

Another variable of interest used in the literature is the exchange rate for affecting stock return. The exchange rate influences the firm's cash flow and the amount of dividend to be paid, especially in an open economy (Eita, 2012). A depreciation of the local currency makes exporting goods less expensive and may lead to an increase in foreign demand and sales for the exporting firms (Pan et al., 2007). As a result, the value of exporting (importing) firms would increase (decrease). Rehman et al. (2009) argue that the importance of international trade in the economy determines the impact of exchange rate on stock prices. However, we do not consider exchange rate in our case because of several reasons. First, the Nepalese stock exchange is overwhelmingly dominated by BFIs; there are no any exporting companies. Second, Nepal has not opened up the capital account so that there is no foreign portfolio investment in the stock market. Third, Nepal has been following the pegged exchange rate with India currency so that exchange rate may not be the important variable for the stock market.

Other than monetary variables mentioned above, the level of real economic activity is the crucial factor in determining the stock market returns (Rehman et al. 2009). There is a general consensus that an increase in economic activity causes stock market returns to increase (Eita, 2012). The most popular measure of real economic activity is gross domestic product (GDP). Unfortunately, data on GDP is normally onannual basis and only in some countries, it can be available on aquarterly frequency. Some use industrial production index as another measure for realeconomic indicator such as Rashid (2008) and Rehman et al.(2009).

In addition, researchers have used other additional variables as well for example debt/GDP ratio and yields of alternative financial assets by Hsing (2014), foreign reserves by Rahman et al. (2009), and variables like capital formation and gold price by Jauhari and Yadav (2014), gross capital formation relative to GDP, credit to the private sector to GDP and net remittance relative to GDP by El-Nadar and Alraimony (2013) and federal fund rate by Yusof and Majid (2007) as factors affecting the performance of stock market.

Empirical results regarding macroeconomic determinants are mixed types. Estonian and Hungarian stock market index have a positive relationship with debt/GDP ratio, real GDP and the German stock market index, and a negative relationship with the exchange rate, the domestic interest rate, the expected inflation rate, and the euro area government bond yield (Hsing 2011; 2014). In case of Namibia, an increase in economic activity and money supply increases stock market prices, while increases in inflation and interest rates decrease stock prices (Eita, 2012). The results suggest that equities are not a hedge against inflation in Namibia, and contractionary monetary policy generally depresses stock prices. In Jordon, money supply, gross capital formation, inflation, and credit to the private sector have significant positive relationship, and income and net remittance have negative relationship with stock market (El-Nadar and Alraimony, 2013).

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<sup>1</sup> Lending rate used by Hsing (2014).

Moreover, there is a co-integrating relationship of Malaysian stock market index with changes in money supply, interest rate, exchange rate, reserves and industrial production index (Rahman et al., 2009).

In case of India, the macroeconomic variables like GDP, savings, capital formation, gold price, industrial output, money supply, exchange rate, WPI, and interest rate have concurrence with the variability of the Sensex index (Jauhari and Yadav, 2014). On the other hand, Naik and Padhi (2012) also examined the Indian stock market index (BSE Sensex) and observed the positive relationship between stock price and money supply and industrial production but negative relationship with inflation. The exchange rate and the short-term interest rate were found to be insignificant in determining stock prices in India. However, Rashid (2008) showed the long run relationship between stock prices and macroeconomic variables like exchange rate, industrial index, interest rate, inflation in Pakistan. Specially, in Pakistan, exchange rate, inflation and GDP growth rate were positively related with stock prices (KSE-100index) while the interest rate was negatively related as found by Khan (2014). Yusof and Majid (2007) found a significant direct impact of US federal fund rate on the Malaysian stock market, reflecting the impact of capital flows on the stock market.

Most studies use either monthly or quarterly data for examining the determinants of stock performance. Ratanapakorn and Sharma (2007), Eita (2012), and Kemboi and Tarus (2012) use quarterly data, while Yusof and Majid (2007), Rahman et al. (2009), Singh (2010), El-Nadar and Alraimony (2013) use monthly data. With regards to methodology, Rahman et al. (2009), Eita (2012) employ VAR framework. Kwon and Shin (2001), Rashid (2008), and El-Nadar and Alraimony (2013) use cointegration and variance decomposition, while Hsing (2011, 2014) uses GARCH method and Rashid (2008), Singh (2010), and Jauhari and Yadav (2014) apply Granger causality test. On the other hand, Yusof and Majid (2007) apply the ARDL approach. Hence, there is no unique way to investigate the determinants of stock market return.

### **3.1 Politics and stock market**

The stock market index, in general, is considered as the reflection of the expectation of future profitability of the listed companies. This market, therefore, tends to be influenced not only by macroeconomic fundamentals, but also by the unexpected political events as well as policy changes. Several studies have found the relationship between the political event and the stock market performance. For example, Beaulieu et al. (2006) investigated the short run impact of the political uncertainty associated with the 1995 Quebec referendum on the stock returns. The study found that the uncertainty surrounding the referendum outcome had short run impact on stock returns of Quebec firm, implying that the stock market was directly influenced by the political risk and uncertainty. Similarly, Jensen and Schmitt (2005) estimated the impact of the four main Brazilian presidential candidates on the mean and variance of the Brazilian stock market using a number of time-series regressions. They argue that political events, such as the election of a politician that is expected to enact “market-friendly” policies, lead to increases in stock market returns while political events that are expected to have a negative impact on the economy and specific firms lead to decreases in stock market returns.

### **3.2 News and stock market**

Stock markets are heavily affected by news and rumours, like a “beauty context” as described by Keynes (1936). News can affect sentiments as well as expectation of investors about the performance of the listed companies. Most importantly, people interpret news differently based on their own cognitive power. There are some empirical examinations on the impacts of news on the stock prices. For example, Boudoukh et al.(2013) investigated the relation between news and the

stock prices of 795 S&P 500 companies, covering the period of January 1, 2000 to December 31, 2009. Using advanced textual analysis method, they find that, when information can be identified and that the tone (i.e., positive versus negative) of this information can be determined, there is a closer link between stock prices and information.

Similarly, Alanyaliet al. (2013) investigated daily print issues of the *Financial Times* from 2<sup>nd</sup> January 2007 to 31<sup>st</sup> December 2012 to quantify the relationship between decisions taken in financial markets and developments in financial news. They find a positive correlation between numbers of times the name of a company mentioned daily in the *Financial Times* and the daily transaction volume of a company's stock both on the day before and on the same day of the news released. Their results provide quantitative support for the suggestion that movements in financial markets and movements in financial news are closely interlinked.

### **3.3 Past Empirical Evidence from Nepal**

There are a few studies on the explaining stock market movement, mainly from micro perspectives in Nepal. For example, Joshi (2012) examined the impact of dividends on stock price in the context of Nepal and found the impact of dividends is more pronounced than that of retained earnings on stock prices in Nepal. Dangol (2008) studied the reaction of Nepalese stock market to announcements of unanticipated political events using the event analysis methodology. His analysis covered the period from 2001 to 2006. He found that good-news (bad news) political announcements generate positive (negative) abnormal returns in the post-event period. This finding suggests that there is a strong linkage between political uncertainty and stock returns in Nepal.

In another study of Dangol (2010) examined the random walk behaviour on daily market returns of the Nepal Stock Exchange for the period between July 2000 and January 2010 and found that the Nepalese stock market does not show any characteristics of random walk and thus, is not weak form efficient. Findings of Bhatt (2010) are also similar. This means news affects the movement of the stock market index. Further, Pradhan and KC (2010) assessed equity share price behaviour in Nepal and tested the hypothesis that share price changes are independent by using weekly data of 26 listed companies from mid-July 2005 to mid-July 2008. They found that random walk hypothesis holds for less frequently traded stocks but do not hold for highly traded stocks at NEPSE.

## **IV. Data and methodology**

### **4.1 Data and sample**

Based on the availability of data and their relevancy as guided by the literature and considering the feature of Nepalese stock market, the following data are taken to empirically examine the determinants of stock market index in Nepal as shown in Table 3.

**Table 3: Variables and their description**

Variable	Description	Unit
SI	NEPSE Index at the end of month	
CPI	CPI index, monthly (base year = 2014/15)	
M2	Broad Money Supply	Rs in million
TB91	91 day Treasury Bill rate	Percent
D1	Political Event Dummy (takes value 1 if negative scenario, 0 otherwise)	
D2	Policy Change Dummy (takes value 1 if margin lending is tightened, 0 if it is relaxed)	
D3	NRB's decision on paid up capital (takes value 1 when NRB hiked the paid up capital requirement)	

The level of real economic activities is one of the crucial determinants of the stock market performance as a scale variable. The traditional measure for such activities is the gross domestic product (GDP). However, GDP data are unavailable on a monthly basis (not even on a quarterly basis) in Nepal. On the other hand, stock index is very sensitive and even daily data are available. TB91 is available on a weekly basis but money supply data are available only on a monthly basis. Hence, monthly data are used in this study. One caveat in our data is that while using stock index, it should be average of daily index, but for simplicity we have used the month end stock index. This may not represent actual movement of stock index observed during a month.

In addition to monetary data, we have also used three dummy variables D1, D2 and D3. The first dummy D1 represents the political scenario (see Appendix 1), D2 is for NRB's policy on margin type lending against the share collateral (Appendix 2), and D3 is for NRB's decision on hike in paid up capital of BFIs licensed by it<sup>2</sup>. Since the share of BFIs' in stock market is dominant in terms of number as well as market capitalisation, NRB's policy of increasing paid up capital may impact the share prices of BFI, thereby overall stock index in Nepal.

The study has used the sample period of August 2000 through November 2017. Though the formal trading in the Nepalese stock market started in 1994, the stock market was in evolving stage and highly immature until 2000. This fact is also reflected in Figure 1, which shows that NEPSE remained relatively flat until 2000. Hence, the sample period of 2000 onwards has been chosen for this study.

#### 4.2 Methodology

The study has used the following general but simple behaviour model.

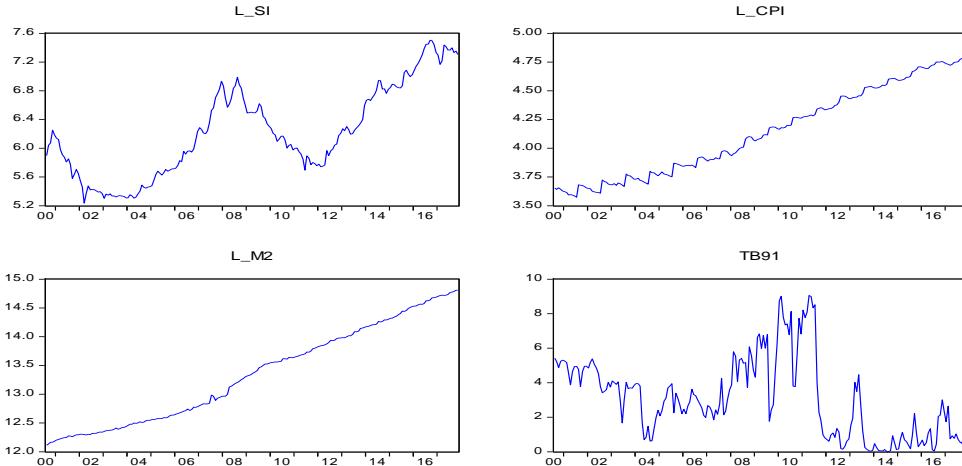
$$SI_t = f(CPI_t, M2_t, TB91_t, SI_{t-1}, D1, D2, D3) \quad \dots \dots (1)$$

where the meanings of symbols are same as described in Table 3. SI, CPI and M2 are used in log form. The first lag of stock market index is also included in our model as the literature suggests that stock prices tend to be highly persistent. A large section of investors are "chartist" who just follows the trend of movement of stock market index. Moreover, information on fundamental comes late so a majority of stock investors apply their own gut feeling. Though stock returns are theoretically assumed to follow random walk as argued by the efficient market hypothesis, many studies have found that the stock returns are auto-correlated. Boudoukh et al. (1994) points out that time series patterns occur in stock returns because investors either overreact or partially adjust to information arriving to the market.

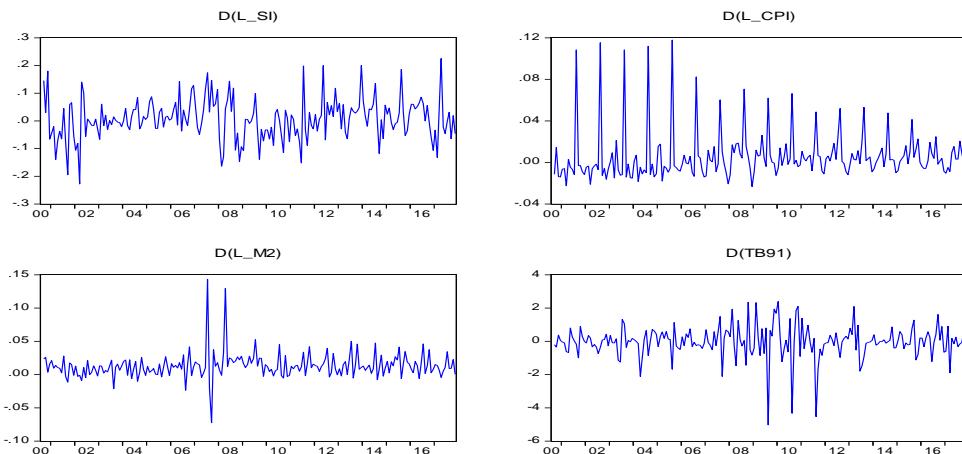
<sup>2</sup>NRB hiked the paid up capital requirement effective from June 2003, April 2007 and August 2015.

Prior to deciding on the appropriate method, a preliminary examination of the nature of the data is necessary. Figure 2 presents the movement of the variables selected for the model above. L\_CPI (log of CPI) and L\_M2 (log of M2) exhibit gradual upward movement while L\_SI (log of SI) and TB91 follow the up and down path. Figure 3 on the other hand shows the movement of first difference of L\_SI, L\_CPI and L\_M2. These data seem to be stationary in first difference.

**Figure 2: Movement of selected variables**



**Figure 3: Movement of selected variables in first difference**



Further, we follow the standard procedure of unit root testing by employing the Augmented Dickey Fuller (ADF) test<sup>3</sup>, which shows that L\_SI and L\_M2 are stationary at first difference and TB91 is also stationary, but L\_CPI is non-stationary even in first difference. The PP test however,

<sup>3</sup>Lag lengths was selected based on Schwartz Information Criteria.

shows that L\_SI, L\_CPI) and L\_M2 are stationary at first difference ( L\_CPI is stationary with constant and trend also) and TB91 is stationary (Table 4). Hence, we consider that L\_SI, L\_CPI, L\_M2 are I(1) variables and TB91 is I(0) variable considering unit root tests of both ADF and PP test, the pattern of the graph shown above and the nature of the data.

**Table 4: Unit root test**

Variables	ADF Test		Philips Perron Test		Order of Integration
	H0: Variable is non-stationary	C, T	H0: Variable is non-stationary	C, T	
L_SI	-0.33	-2.12	-0.18	-1.62	I(1)
dL_SI	-11.61***		-11.61***		
L_CPI	0.40	-2.65	1.21	-3.76**	I(1)
dL_CPI	-2.52		-17.70***		
L_M2	0.97	-2.96	1.46	-1.99	I(1)
dL_M2	-3.21**		-15.41***		
TB91	-3.15**	-3.39*	-3.15**	-3.43**	I(0)

\*\*\* implies significant at 1% level, \*\* implies significant at 5% level and \* implies significant at 10% level.

*Source: Authors' calculation*

Since not all selected variables are in same order, we cannot follow VAR or co-integration approach. Rather, the following models are estimated by OLS using first difference of I(1) variable. Now, dL\_SI represents the rate of change in stock index or return. Similarly, dL\_M2 represents growth of money and dL\_CPI denotes the inflation rate in the economy. It seems that following models are able to capture the performance of stock market. Considering the possibility of multi-collinearity among explanatory variables, we do the estimation on step by step basis, and finally all explanatory variables are included in equation (5).

$$dL_{SI_t} = \alpha + \beta_1 dL_{CPI_t} + \delta_1 D1 + \delta_2 D2 + \delta_3 D3 + \gamma dL_{SI_{(t-1)}} + \varepsilon_t \quad \dots \dots (2)$$

$$dL_{SI_t} = \alpha + \beta_2 dL_{M2_t} + \delta_1 D1 + \delta_2 D2 + \delta_3 D3 + \gamma dL_{SI_{(t-1)}} + \varepsilon_t \quad \dots \dots (3)$$

$$dL_S_t = \alpha + \beta_3 TB91_t + \delta_1 D1 + \delta_2 D2 + \delta_3 D3 + \gamma dL_{SI_{(t-1)}} + \varepsilon_t \quad \dots \dots (4)$$

$$dL_{SI_t} = \alpha + \beta_1 dL_{CPI_t} + \beta_2 dL_{M2_t} + \beta_3 TB91_t + \delta_1 D1 + \delta_2 D2 + \delta_3 D3 + \gamma dL_{SI_{(t-1)}} + \varepsilon_t \quad \dots \dots (5)$$

#### 4.2.1 ARDL Bound testing

Since the selected variables are I(1) and I(0), alternative model can be Autoregressive Distributed Lag (ARDL) model as postulated by Pesaran et al. (2001), which is useful for examining both short and long run relationship among selected variables simultaneously. ARDL is represented in basic form as follow in equation (6).

$$L\_SI_t = \alpha_0 + \sum_{i=1}^{\rho} \alpha_i L\_SI_{t-i} + \sum_{i=0}^q \beta_{ix} X_{t-i} + \delta \cdot D + \varepsilon_t \dots \dots \dots (6)$$

where  $\mathbf{X}$  is a set of explanatory variables i.e. { $L\_CPI$ ,  $L\_M2$  and  $TB91$ }, and  $\mathbf{D}$  is a vector three dummies {D1, D2, D3},  $\delta$  is a set of coefficients for dummies as { $\delta_1, \delta_2, \delta_3$ } and  $\varepsilon_t$  is a random disturbance term. The error correction version of the ARDL model is given by equation (7)

$$\Delta L\_SI_t = \alpha_0 + \sum_{i=1}^{\rho} \alpha_i \Delta L\_SI_{t-i} + \sum_{i=1}^q \beta_{ix} \Delta X_{t-i} + \theta_0 L\_SI_{t-1} + \theta \cdot X_{t-1} + \delta \cdot D + e_t \dots \dots \dots (7)$$

where  $\theta$  is a set coefficients for explanatory variables as { $\theta_1, \theta_2, \theta_3$ }.  $\Delta$  is a difference operator. Lags in equation (7) should be selected in such a way to make  $e_t$  should be *i.i.d.* For examining long run equilibrium relationship among variables, we perform an F-test on the null hypothesis of  $H_0: \theta_0=\theta_1=\theta_2=\theta_3=0$ ; against the alternative that  $H_0$  is not true. Pesaran et al.(2001) provide bounds on the critical values for the asymptotic distribution of the F-statistics, where the lower bound is for the case of all variables I(0) and the upper bound is for the case where all the variables are I(1). If the F-statistics exceeds the upper bound, the null hypothesis is rejected and co-integration is established. Coefficients  $\alpha_i$  and  $\beta_{ix}$  represents short run dynamics and a vector of coefficients  $\theta$  represents the long run relationship. Existence of cointegration leads us to meaningfully estimate the long-run equilibrium relationship between the variables and error correction model. Eviews10 is used to estimate ARDL model.

## V. Empirical results

### 5.1 Cross correlation analysis

Table 5 presents the cross-correlation among variables under consideration. The  $L\_SI$  has significant positive correlation with  $L\_CPI$  and  $L\_M2$ , and negative correlation with  $TB91$  as expected theoretically. Further, the correlation between  $L\_M2$  and  $L\_CPI$  is very high of 0.99 and significant. Similarly,  $TB91$  has negative but significant correlation with  $L\_CPI$  and  $L\_M2$ . Most researchers appear to consider the value of 0.9 as the threshold beyond which problem of multicollinearity can occur (Asteriou and Hall, 2007).

**Table 5: Cross-correlation of variables**

	$L\_SI$	$L\_CPI$	$L\_M2$	$TB91$
$L\_SI$	1.00			
$L\_CPI$	0.78 (0.00)	1.00		
$L\_M2$	0.79 (0.00)	0.99 (0.00)	1.00	
$TB91$	-0.30 (0.00)	-0.45 (0.00)	-0.42 (0.00)	1.00

p-value in parenthesis  
Source: Authors' calculation

However, after taking first difference ( $d$ ) of  $L\_SI$ ,  $L\_CPI$  and  $L\_M2$ , correlation coefficients decline substantially as shown in Table 6. Now,  $dL\_SI$  is significantly correlated with money growth and  $TB91$  with expected signs, but not with inflation rate.  $TB91$  is not significantly correlated with inflation rate and money growth. Money growth and inflation is significantly correlated to each other, but with negative sign which is contradictory to money-price relation normally assumed. However, the correlation between money growth and inflation is not as high as found in level, so that the use of them in model together may not violate the multi-collinearity issue.

**Table 6: Cross-correlation after first difference**

	dL_SI	dL_CPI	dL_M2	TB91
dL_SI	1.00			
dL_CPI	0.073 (0.29)	1.00		
dL_M2	0.138 (0.05)	-0.182 (0.01)	1.00	
TB91	-0.231 (0.00)	-0.052 (0.45)	0.003 (0.96)	1.00

p-value in parenthesis

Source: Authors' calculation

## 5.2 Empirical estimation and discussion

variables such as dL\_M2 and TB91 rate are found to be statistically significant separately as well as taking together in the last column. In contrast to the finding of Shrestha and Subedi (2014) up to the sample period of mid-July 2014, dL\_CPI does not have significant coefficients in both equation (2) and (5), although these coefficients have expected positive signs. In the combined equation, the value of coefficient of dL\_M2 increased compared to equation (3) while it was used singly. Explanatory power of the model does not improve in the combined model in equation (5), shown in the last column, which is same as in equation (3) in the third column at around 12 percent.

The dummy variables D1 and D2 are strongly significant in all four cases with expected signs. However, the dummy variable D3 is significant at 10 percent only in equation (4), shown in fourth column, reflecting that it is not robust variable, though it has expected sign. Lastly, coefficients of one period lag of dL\_SI are statistically significant in all four cases.

**Table 7: Regression Results**

Dependent Variable: dL\_SI

Number of observations: 206

	<i>Eq2</i>	<i>Eq3</i>	<i>Eq4</i>	<i>Eq5</i>
const	0.02* (0.07)	0.01 (0.23)	0.03** (0.02)	0.03*** (0.01)
dL_CPI	0.17 (0.41)			0.26 (0.22)
dL_M2		0.63** (0.02)		0.67** (0.01)
TB91			-0.004** (0.05)	-0.004* (0.08)
D1	-0.04*** (0.00)	-0.03*** (0.00)	-0.03*** (0.01)	-0.03*** (0.01)

D2	-0.04*** (0.004)	-0.04*** (0.00)	-0.03*** (0.01)	-0.04*** (0.00)
D3	0.02 (0.11)	0.02 (0.12)	0.02* (0.06)	0.01 (0.26)
dL_SI(-1)	0.14** (0.04)	0.16** (0.02)	0.12* (0.08)	0.14** (0.05)
Adj. R-squared	0.09	0.12	0.11	0.12
D-W stat	1.99	2.02	2.02	1.99

Note: \*\*\* implies significant at 1% level, \*\* implies significant at 5% level and \* implies significant at 10% level. Figures in parenthesis are the respective P-values.

Source: Authors' calculation

Based on the empirical results shown above, the change in stock index is found to be positively related to the growth of M2, and inversely related to TB91. Growth in money supply leads to greater demand for stocks as result of portfolio substitution with ample liquidity. Given the limited supply of stocks, this exerts upward pressure on stock prices in short run. Negative relationship between interest rate and stock market return implies that low interest rate make stocks more attractive because of low cost of credit as well as low opportunity cost foregone for using own bank deposits. Hence, in case of low interest rates, depositors may use their deposits to buy stock on the one hand and on the other hand, people can borrow at the low interest rates from banks and financial institutions to make investment in share market. Our findings are similar to Khan (2014).

The negative signs for the coefficients of both dummies indicate that political uncertainty and tightening of loans against share collateral by the NRB have negative impact on the NEPSE index. However, the impact of paid-up capital hike policy is not statistically strong enough on impacting change in stock index, but some impact cannot be ruled out.

The positive coefficient for lagged stock market index term indicates the past month's stock price has a significant impact on the current month stock index. It shows the persistence behaviour, in other words, chartist behaviour in the stock market.

In all four equations,  $R^2$  is not so high which indicates that selected variables explain very little variation in stock index. This means that news, rumours and speculations might have played the important role in fluctuating stock market index. Moreover, stock market changes daily while other macroeconomic data are not available on a daily basis.

### 5.3 Results from ARDL model

The appropriate lag lengths of  $\rho$  and  $q$  selected based on AIC criteria, which is found as ARDL(11,2,3,1) including constant without trend and ARDL(9,2,3,7) with constant and trend. F-statistics for testing the existence of a level relation in ARDL (11,2,3,1) model is found 3.99 which is significant only at 10 percent level of significance since critical bound values for  $k=3$  at that level of significance are 2.72 and 3.77, but falls within inconclusive region in case of 5 percent level of significance for which critical bound values are 3.23 and 4.35. However, F-statistics for ARDL (9, 2,3,7) is found at 6.18 which is higher than critical bound values (4.01, 5.07) at 5 percent level of significance. Hence, we reject the null hypothesis that there exists no level relationship.

After examining the existence of level relation, we estimate the level relationship as shown in the following equations.

In case of ARDL(11,2,3,1)

$$L\_SI = 1.59L\_CPI - 0.40L\_M2 - 0.22TB91$$

In case of ARDL (9,2,3,7)

$$L_{SI} = 2.36L\_CPI - 6.32L\_M2 - 0.52TB91$$

In both cases signs of coefficients are same but magnitudes are quite higher in the second case. Except coefficient of M2, other coefficients are of expected signs. The level relation shows that there is positive association between stock index and consumer price index, as found in many similar studies, implying that investors have been taking stock market as a hedge against inflation. However, stock index has negative long run relation with M2 which contradicts with the positive short-run relationship found in Table 6, but the results validate the views of Fama (1981). Moreover, as earlier, stock index has inverse long run relation with TB91.

Table 8 further presents the error correction estimation of both cases. Error correction coefficients are found statistically significant in both cases which shows that stock index makes the correction of any disequilibrium emerged in long run relation in the immediate last month. It seems that 3 to 4 percent error of past month is corrected in current month.

In error correction estimation, we can also observe short-run relation up to selected lag lengths for each ARDL model. One period lag of stock return is statistically significant in the first model (ARDL (11,2,3,1) but it disappears when we add trend (see ARDL(9,2,3,7)) whose coefficient is statistically significant. Not only immediate past month, but also stock return of a few months back also have significant coefficients such as lag 10 in ARDL(11,2,3,1) and lag 4, 5, 7 in ARDL (9,2,3,7). But in latter cases, coefficients are of with negative signs which is due to the cyclical nature of the movement of stock index.

One period lag of change in L\_CPI has statistically significant negative coefficients in both cases validating the view of Fama (1981) that inflation causes uncertainty thereby reduces the stock return. This type of relation may also happen due to real balance effect of reducing purchasing power by inflation. Change in L\_M2 has statistically significant contemporary impact on stock return in both cases on account of liquidity effect. Positive impact can even be seen after two months lag of growth of broad money.

Impact of change in TB91 is not significant contemporarily in both cases in Table 8. However, in ARDL(9,2,3,7), change in TB91 in 6 months lag have some statistically significant and positive impact at 5 percent level of significance on stock return. Changes in TB91 in first, fourth and fifth lag also have positive coefficients which are significant at 10 percent level of significance.

Coefficients of D1 in both ARDL models are statistically significant and same as found in Table 7 implying the robustness feature of this dummy. D2 is not found statistically significant in both cases. D3 is statistically significant with positive value only in ARDL(11,2,3,1) implying some sort of positive association with stock return which was not found much significant in Table 7. This implies that some impact of hike in paid up capital on stock price cannot be ignored, though it is not a robust explanatory variable.

Both ARDL model explains only one quarter of change in stock return, which is an improvement compared to the models shown in Table 7. LM tests show that in both ARDL model, the null hypothesis of no serial correlation cannot be rejected, reflecting the soundness of these models.

**Table 8: Error correction estimation (Dependent variable D(L\_SI)**

ARDL (11, 2,3,1)			ARDL(9,2,3,7)		
Variables	Coefficients	p-value	Variables	Coefficients	p-value
C	0.22	0.0001	C	2.14	0.0000
D(L_SI(-1))	<b>0.14</b>	<b>0.0390</b>	@TREND	<b>0.002</b>	<b>0.0000</b>
D(L_SI(-2))	-0.06	0.3692	D(L_SI(-1))	0.09	0.1892
D(L_SI(-3))	-0.076	0.2701	D(L_SI(-2))	-0.10	0.1342
D(L_SI(-4))	-0.11	0.1052	D(L_SI(-3))	-0.13	0.0656
D(L_SI(-5))	-0.099	0.1449	D(L_SI(-4))	<b>-0.15</b>	<b>0.0336</b>
D(L_SI(-6))	0.12	0.0820	D(L_SI(-5))	<b>-0.19</b>	<b>0.0096</b>
D(L_SI(-7))	-0.098	0.1532	D(L_SI(-6))	0.03	0.6489
D(L_SI(-8))	-0.08	0.2566	D(L_SI(-7))	<b>-0.15</b>	<b>0.0332</b>
D(L_SI(-9))	0.03	0.6457	D(L_SI(-8))	-0.12	0.0879
D(L_SI(-10))	<b>0.17</b>	<b>0.0155</b>	D(L_CPI)	0.33	0.1341
D(L_CPI)	0.31	0.1679	D(L_CPI(-1))	<b>-0.50</b>	<b>0.0229</b>
D(L_CPI(-1))	<b>-0.60</b>	<b>0.0063</b>	D(L_M2)	<b>0.69</b>	<b>0.0090</b>
D(L_M2)	<b>0.80</b>	<b>0.0024</b>	D(L_M2(-1))	-0.007	0.9783
D(L_M2(-1))	-0.055	0.8359	D(L_M2(-2))	<b>0.63</b>	<b>0.0235</b>
D(L_M2(-2))	<b>0.60</b>	<b>0.0307</b>	D(TB91)	0.006	0.2334
D(TB91)	0.005	0.2892	D(TB91(-1))	0.01	0.0539
D1	<b>-0.04</b>	<b>0.0017</b>	D(TB91(-2))	0.003	0.5521
D2	-0.019	0.2197	D(TB91(-3))	0.004	0.3908
D3	<b>0.022</b>	<b>0.0489</b>	D(TB91(-4))	0.009	0.0583
CointEq(-1)*	<b>-0.039</b>	<b>0.0001</b>	D(TB91(-5))	0.008	0.0860
AdjR2	0.24		D(TB91(-6))	<b>0.011</b>	<b>0.0244</b>
LMtest	0.82	0.63	D1	<b>-0.03</b>	<b>0.0225</b>
			D2	-0.019	0.1890
			D3	0.015	0.1543
			CointEq(-1)*	<b>-0.03</b>	<b>0.0000</b>
			AdjR2	0.25	
			LM Test	1.1	0.37

## VI. Conclusions

This paper examines the factors affecting stock market index in Nepal, which has been passing through up and down in recent years. Since stock market always tends to be highly sensitive and volatile was examined the factors affecting stock market index on monthly data. It is revealed that Nepalese stock market has been behaving as expected theoretically to large extent. It has strong positive relationship with growth of money supply, and negative response to interest rate. It shows that stock index tends to increase when there is ample liquidity available at a low interest rate. Though not strong, positive association between stock index and inflation cannot be ruled out. More importantly, the stock market performance has been found to be influenced by political changes similar to finding of Dangol (2008). The positive outlook on political stability has positive impact on stock market index. Further, NRB's policy on lending against share collateral and paid

up capital requirement has also impact on the movement of stock market index. Nepalese stock market is also found highly *trend-follower*, showing persistence behaviour. Despite the extension of model examining through ARDL technique, the explanatory power of the model increased only up to explaining one-quarter of change in stock index, which indicates the large role of news, rumours and speculation on influencing the stock index. These types of variables are hard to be quantified and applied in the model.

A number of policy implications can be drawn from this study. First, the Nepalese stock market has been quite responsive to macroeconomic development, especially monetary sector development. Second, a loose monetary policy could trigger an asset price bubble in share market, which is mainly dominated by BFIs. Third, share investors seem to watch the political development closely. Hence, a positive political development with stability can promote share market further which can play a vital role for financial intermediation and resource mobilisation. Fourth, NRB's policy on lending against share collateral has been effective in influencing the share market. Fifth, hike in paid-up capital of BFIs also increases the stock prices. Sixth, share market is highly influenced by rumours, news and speculations; available macroeconomic variables, political and policy variables are not enough to predict the direction of change in stock index fully. To reduce rumours and speculation, transparency should be increased in this market by making information related to listed companies easily accessible and available. Transparency and communication should, in fact, be enhanced by the concerned authorities in order to clear gossips and rumours in the market.

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## Appendix 1

### List of major political events and likely impact on share market

S. N.	Date	Event	Possible impact
1	June 2001	The Royal massacre.	Bad
2	Feb. 2005	King Gyanendra dismissed Prime Minister Sher Bahadur Deuba and took up executive power.	Bad
3	Oct. 2005	Cease fire by the Maoists.	Good
4	Jan. 2006	Cease fire withdrawn by the Maoists	Bad
5	Apr. 2006	Restoration of Parliament and start of peace process	Good
6	Nov. 2006	Peace agreement between the government and Maoists; Maoists agreed to lay down arms.	Good
7	Apr. 2007	Maoists joined interim government, a move that took them into the political mainstream.	Good
8	Jan. 2008	A series of bomb blasts killed and injured dozens in the southern Terai plains, where activists were demanding regional autonomy.	Bad
9	Apr. 2008	Former Maoist rebels became the largest party in elections of the new Constituent Assembly (CA), but failed to get an outright majority.	Bad
10	Aug. 2008	Maoist Leader Puspa Kamal Dahal (Prachanda) formed coalition government, with Nepali Congress in opposition.	Good
11	May 2009	Prime Minister Prachanda resigned in a row with President Yadav. Maoists left the government after other parties opposed integration of former rebel fighters into national army.	Bad
12	Jun. 2010	PM Madhav Kumar Nepal quit under Maoist pressure.	Bad
13	May, 2011	Constituent Assembly failed to meet deadline for drawing up new constitution.	Bad
14	Aug. 2011	PM Jhalnath Khanal resigned after government failed to reach compromise with opposition on new constitution.	Bad
15	May 2012	Prime Minister Baburam Bhattarai dissolved CA, called elections for November 2012, after politicians missed a final deadline to agree on a new constitution.	Bad
16	Nov. 2013	Election for CA second time. Nepali Congress party, Nepal Communist Party (UML) became the first and second largest party with two-third majority together. These two parties have some common political agenda.	Good
17	Sep. 2015	Economic blockade observed for five months which seriously disturbed economic activities.	Bad

Sources: Dangol (2008) and BBC News, South Asia: <http://www.bbc.com/news/world-south-asia-12499391>

## Appendix 2

### List of major policy changes by NRB on loans against share collateral and likely impact on share market

S. N.	Date	Event	Possible Impact
1	Oct7, 2007	Margin lending limit reduced to 50 % of last 90 days average price of shares; restriction on restructuring of margin loan; regulation requiring maximum period of margin loan not to exceed 1 year.	Bad
2	Jan 22, 2008	Margin lending limit not to exceed 50 % of the last 180 days average price of shares or 50 % of market price, whichever is minimum.	Bad
3.	Jan 15, 2009	Regulation requiring to make a margin call if the collateral is seen not sufficient to secure the loan.	Bad
4.	Oct 30, 2009	Restructuring of the margin loan was allowed provided that the 50 % of principal and interest has been repaid.	Good
5.	Feb 22, 2010	No need to make margin call if the price fall of the share is not more than 10%; About 75 % of margin loan amount was allowed to restructure	Good
6.	Aug 10, 2010	Margin lending limit increased to 60% of the last 180 days average price of shares or 50 % of market price, whichever is minimum.	Good
7.	Jul 14, 2011	BFIIs were allowed to make self decision on the limit of margin lending based on the last 180 days average price of shares or the current market price of share, whichever is lower, considering the risk level of lending; Revaluating the shares and extending loan limit was restricted.	Good
8.	Jun 10, 2012	Loan could be extended with the guarantee from the broker instead of pledging original share certificates.	Good
9	24 August 2016	NRB again introduced the margin ratio of 50 percent as before while lending against collateral of share..	Bad

*Source: Various NRB Circulars*

# **Role of financial institutions in economic growth: A case of Nepal**

**Bharat Ram Dhungana<sup>\*</sup>, PhD**

## **Abstract**

*This paper examines short run and long run causal relationship between financial institutions and economic growth of Nepal. The gross domestic product (GDP), financial system deposit (FSD), credit to government and state owned enterprises (CGSOE), domestic credit to private sectors (DCPS) and gross national expenditure (GNE) have been used to find the causal relationship between financial institutions and economic growth using granger causality (GC) test, Johnson co-integration test, vector error correction model (VECM) and Wald test statistics. The VECM suggests for the validity of long run association among the variables of GDP, CGSOE, DCPS and GNE. The Wald test statistic also finds short run joint effects of independent variables to dependent variables-GNE but in the case of dependent variable GDP, there is no short run joint effect. The study shows that there is a long-run association between financial institutions and economic growth of Nepal. A well-developed financial system facilitates for economic growth of nation in long run. The regulatory authority should accelerate financial efficiency that may facilitate to stimulate adequate capital formation and investment in productive sectors.*

**Keywords:** Economic growth; financial system; granger causality; regulatory authority

## **1. Introduction**

Financial sectors are the backbone of economy that facilitates to achieve sustained economic growth through efficient financial intermediation. A modern and healthy financial system is required for the accelerated economic growth in order to pool and utilise financial resources, reduce costs and risks, expand and diversify opportunities, enhance efficiency of resources and promote the productivity, and facilitate economic growth. Therefore, financial system needs to be structured on the ground of international norms and practices that helps to develop strong financial foundation in the country.

A sound financial system plays a significant role for the economic growth of the nation. Financial institutions facilitate to accumulate scattered capital and encourage investment by identifying and financing productive business opportunities. Economists have generally reached into a consensus on the significant role of financial institutions in economic development. Schumpeter (1934) concluded that banking sector is an engine of economic growth through its funding of productive investment. Thus, financial institution is considered as a key factor for the economic growth of the nation.

A number of studies have shown that countries with higher level of financial development grow faster than those with lagging financial systems. A country having poor financial system may have to face many problems that ultimately affects to the economic development. There is no doubt that accelerated economic development will require satisfactory progress in financial system. The

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economic development can be measured by growth indicators such as GDP, GNP, and per capita income. There are number of indicators that may be applied to measure the link between financial development and economic growth. Financial system deposit, credit to government and state owned enterprises, domestic credit to private sectors, and gross national expenditure are some of the widely used financial deepening indicators to measure their effects on economic development. A strong correlation between these development indicators may lead to the economic growth.

The objective of this study is to examine the role of financial institutions in economic growth with reference to Nepalese economy. The short and long-run causal relationship has been assessed between financial indicators and economic indicators to find out the contribution of financial institutions on economic growth of Nepal. The paper is based on secondary data published by the World Bank. The study has covered the time series of 32 years from 1980 to 2012.

## **2. Methodology**

There is need to test stationarity of the variables for which unit root test in time series data, mainly Augmented Dickey Fuller (ADF) test method has been applied. The causal relationship between financial institutions and the economic growth has been examined with the help of pair-wise Granger causality test. The Johansen co-integration test has been used to find the cointegration of the variables. The VAR model has been applied to test the long run association between the variables. Moreover, Wald test statistics has been used to find out the short-run joint causality of independent variables

## **3. Literature review**

Kaushal and Ghosh (2016) find a long run relationship between financial institutions and economic growth with reference to Indian economy. Development of banking institutions plays an important role in stimulating financial development and thereby growth of economy in any country. However the causal effect of these financial institutions cannot be generalised as the development of financial institution is quite different in nature and scale in different countries.

Mahajan and Verma (2014) examine financial development and economic growth in India. The empirical results based on cointegration and VECM provides evidence for long run equilibrium relationship between financial development and economic growth in India. Results clearly depict long run causality from financial development to economic growth. But the study does not find short-run relationship between financial development and economic growth.

Kharel and Pokhrel (2012) analyse that Nepal's financial structure matter for economic growth or not. The empirical results using Johansen's cointegrating vector error correction model suggest that banking sector plays a key role in promoting economic growth compared to capital market in Nepal. It may be either the size of capital market is too small to seek the relationship or it is weakly linked to real economic activities. The result implies that the policy should focus on banking sector development by enhancing its quality and outreach as it promotes economic growth in Nepal.

Bhetuwal (2007) assesses financial liberalisation and financial development in Nepal. Financial development is not the outcome of only policy changes in the financial sector, but also depends on the demand of financial services in the economy. The development of the financial sector is the backbone for economic development of a country. But it cannot be achieved in isolation with the other sectors of the economy. Simultaneous growth in all the sectors of the economy can increase more demand of financial services and it can stimulate financial development. Unidirectional causality from financial liberalisation to financial development found from the Granger causality test depicts this practical situation.

Shrestha (2005) examines financial liberalisation in Nepal. He concluded that financial liberalisation is positively associated with growth, but negatively associated with income equality and financial stability. But the study did not find any causal relationship between financial development and economic growth in Nepal. Hence, the financial liberalisation in Nepal has not facilitated a financial development to the extent that contributed significantly to the economic development of the country.

The relationship between financial development and economic growth is controversial both from the theoretical and empirical perspectives. Some economic researchers argue that finance precedes economic growth while on the other hand some argue that economic growth leads to financial development. Levine (2004) argues that the costs of processing and acquiring information are greatly reduced by financial intermediaries and this improves resource allocation in the economy. This argument reinforces what Schumpeter (1934) said about the same relationship. This line of thinking was also investigated by Blackburn and Hung (1996). Greenwood and Jovanovic (1990) came up with a formal dynamic model for the relationship between finance and growth. Their results illustrated that financial development and economic growth actually reinforce each other.

Calderon and Liu (2003) examine pooled data of 109 countries to find the direction of causality between financial development and economic growth by employing Gewke Decomposition test. They found the five distinct results (i). Financial development generally leads economic growth, (ii). Bi-directional causality occurs between financial development and economic growth, (iii). In developing countries, financial deepening causes more to growth than industrial countries, (iv). Financial development has larger effect on economic growth in long run, and (v). Financial deepening contributes economic growth through more rapid capital accumulation and productivity growth.

Demrgic-Kunt and Levine (2001) assess the relationship between financial structure and economic development of 150 countries. They have compared economic development of countries with bank-based and market-based financial system, and their legal, regulatory, tax and macro-economic determinants of financial structure. They have found (i). Banks, non-banks and stock markets are larger, more active and efficient in richer countries, (ii). Financial systems are more developed in richer countries than in developing countries on average, and (iii). Financial systems tend to become more market oriented as a country becomes richer.

Beck, Levine, and Loyaza (2000) assess the empirical relationship between the level of financial intermediary development and (i) economic growth, (ii) total factor productivity growth, (iii) physical capital accumulation, and (iv) private savings rate by using pure cross-country instrumental variable estimator to extract the exogenous component of financial intermediary development, and a new panel technique to control for biases associated with simultaneity and unobserved country specific effects. They concluded that financial intermediaries exert a large positive impact on total factor productivity growth and the long run links between financial intermediary development and both physical capital growth and private savings rates are weak.

King and Levine (1993a) relate GDP per capita growth to nine different indices of financial deepening: narrow money to GDP, broad money to GDP, quasi money to GDP, central bank domestic credit to GDP, commercial bank domestic credit to GDP, gross claims on the private sector to GDP, commercial bank domestic credit to total domestic credit, claims on non-financial private sector to total domestic credit and claims on the private sector by non-deposit money banks to GDP.

King and Levine (1993b) again also use four measures of financial development indicators. The first is to measure the size of financial intermediaries and equals liquid liabilities of the financial

system (currency plus demand and interest bearing liabilities of banks and non-bank financial Intermediaries) divided by GDP. The second is to measure of financial development, degree to which the central bank versus commercial banks is allocating credit. This ratio is calculated as bank credit divided by bank credit plus central bank domestic credit. The third measure of financial development is the ratio of credit allocated to private enterprises to total domestic credit. The fourth measure is credit to private enterprises divided by GDP. They find that there is a strong positive relationship between each of the four financial indicators and the three growth indicators (long-run real per capita growth rates, capital accumulation and productivity growth).

#### **4. Growth of financial institutions in Nepal**

The history of banking in Nepal is not very old, as a first bank, Nepal Bank Limited, was established in 1937. With the establishment of Nepal Rastra Bank, as a Central Bank of the country in 1956, the Nepalese financial system gained momentum. Industrial Development Bank was established in 1957 as the first development bank, which was converted into Nepal Industrial Development Corporation in 1959. Within a decade of the establishment of Nepal Rastra Bank, a number of financial institutions came into operation. Rastriya Banijya Bank, the second commercial bank, fully owned by the government was established in 1966. Agricultural Development Bank came into operation in 1968 with the objective of providing long-term and medium-term credit facilities to agriculture sector. After adaptation of the liberalisation policy in Nepal, financial sector has made a tremendous progress both in terms of the number of bank and clients of financial services. The growth and development of Nepalese financial institutions has been presented in table 1.

**Table 1: Growth and development of financial institutions in Nepal**

Types of Financial Institutions	Mid July									
	1980	1985	1990	1995	2000	2005	2010	2015	2016	2017
CBs	2	3	5	10	13	17	27	30	28	27
DBs	2	2	2	3	7	26	79	76	67	40
FCs	0	0	0	21	45	60	79	47	40	28
MFDBs	0	0	0	4	7	11	18	38	42	53
SCCs	0	0	0	6	19	20	15	15	15	14
FINGOs	0	0	0	0	7	47	45	27	25	25
<b>Total</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>44</b>	<b>98</b>	<b>181</b>	<b>263</b>	<b>233</b>	<b>217</b>	<b>187</b>

*Source: Banking and financial statistics of various issues and list of BFIs, NRB.*

*CBs: Commercial Banks; DBs: Development Banks; FCs: Finance Companies; MFDBs: Micro-finance Development Banks; SCCs: Saving and Credit Cooperatives and FINGOs: Financial Intermediary Non-government Organizations.*

The trend of establishment of commercial banks was high compared to the development banks till the date of 2004. The number of development banks and finance companies has been established in Nepal after the 1990. Till mid July 2017, total number of class 'A' to class 'D' bank and financial institutions including Saving and Credit Cooperatives and Financial Intermediary Non-government Organisations, reached to 187 however, these number has been decreased recently due to merger policy adopted by financial institutions.

#### **5. Key variables used in the model**

The number of indicators may have direct and indirect relationship between financial institutions and the economic growth. The problem of choosing from the vast number of applicable financial development indicators, however, the researcher has selected the following major variables to find the causal relationship between financial development and economic growth:

**a. Gross domestic product**

Gross domestic product (GDP) is the market value of the final goods and services produced within a country in a given time. GDP per capita is often considered as the standard indicator rather than taking in total basis because it may highly vary as per the size and population of the country. The annual growth of GDP or GDP per capita is more appropriate in econometric analysis.

**b. Financial system deposit**

The financial system deposit (FSD) is another indicator of financial development that includes demand deposits, time deposits, and saving deposits in banks and other financial institutions. The FSD has been used as a share of GDP in the model.

**c. Credit to government and state owned enterprises**

The credit to government and state owned enterprises (CGSOE) refers to the total credit provided by the banks and financial institutions for government and state owned enterprises. It is a ratio between credit by domestic money banks to the government and state-owned enterprises and GDP.

**d. Domestic credit to private sector**

Domestic credit to private sector (DCPS) refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities and trade credits, and other accounts receivable that establish a claim for repayment. The DCPS has been used as a share of GDP in the model.

**e. Gross national expenditures**

Gross national expenditure (GNE) is the sum of household final consumption expenditure, general government final consumption expenditure, and gross capital formation.

**6. Model used in the research**

The following models have been applied to find out the impact of financial institutions on economic growth of Nepal.

**a. Unit root test**

Stationarity is an essential test for time series data, and a time series data is said to be stationary if it has time invariant mean and variance. This test will examine the order of integration of data. If the series is non-stationary, it is said to have unit root in its characteristic equation. Non-stationary time series data should be transformed into stationary by differencing.

The Dickey–Fuller tests assume that the disturbances in the model as stated are white noise. An extension which will accommodate some forms of serial correlation is the Augmented Dickey–Fuller (ADF) test. The ADF test has been presented in equation (I):

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad (I)$$

Where,  $\varepsilon_t$  is a pure white noise error term.

### b. Causality test

In an econometric model, causality refers to the direction of change in one variable due to change in another variable. Not only one directional causality but also bi-directional relationship between the variables may exist in the system. The economic growth is explained by financial development variables and if financial development causes growth and growth causes financial development then it can be possible that the coefficient is statistically significant. In such situation, Granger causality test ascertains the bi-directional causality.

The Granger causality test assumes that the information relevant to the prediction of the respective variables size and structure of financial institutions and economic growth is contained solely in time series data on these variables. The objective of the research work is to examine whether development of financial institutions leads economic growth or growth leads the development of financial institutions. The development of financial institutions variables are depository and non-depository financial institutions. The causality test provides the support of economic growth led to the development of financial institutions. The equation (II) and (III) provides the framework to measure the short-run causality among the variables.

$$X_t = \alpha_0 + \sum_{i=1}^p \alpha_i X_{t-i} + \sum_{i=1}^p \beta_i Y_{t-i} + \mu_{1t} \quad (\text{II})$$

$$Y_t = \delta_0 + \sum_{i=1}^p \delta_i X_{t-i} + \sum_{i=1}^p \gamma_i Y_{t-i} + \mu_{2t} \quad (\text{III})$$

### c. Cointegration test

Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be cointegrated. The Johansen cointegration test has been applied to find out whether cointegration exists between the variables or not. The objective of the Johansen cointegration test is to find out the cointegration and decide for the application of restricted Vector Autoregressive Model (also known as VECM) or unrestricted Vector Autoregressive Model. The cointegration test has been presented in equation (IV).

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + e_t \quad (\text{IV})$$

### d. Vector error correction model (VECM)

VECM is an econometric model applied for testing long-run relationship among the variables. This model is a category of multiple time series model that directly estimates the speed at which a dependent variable Y returns to equilibrium after a change in an independent variable X. VECM is a theoretically-driven approach useful for estimating long term effects of one time series on another. The VEC model has been presented in equation (V).

$$\Delta Y_t = \alpha_0 + \alpha_{1i} \sum_{i=1}^m \Delta x_{t-1} + \alpha_{2k} \sum_k^n \Delta z_{t-k} + \alpha_3 \vartheta_{t-1} + \varepsilon_t \quad (\text{V})$$

## 7. Result and discussion

### a. Unit root test

The researcher has tested the unit root by using ADF test for each series of the variable individually whether the data has stationarity or not. The lag length selection has been set automatic based on Schwarz information criterion (SIC) and the maximum length of lag is 9 by default. The researcher has presented the outcome of the unit root test in the followingTable 2.

**Table 2: Outcome of unit root test**

Series	Augmented Dickey-Fuller (ADF) Test Statistic		Degree of Integration
	Level	First Difference	
GDP	-8.71*	-	I(0)
FSD	2.72	-3.29*	I(1)
CGSOE	-1.01	5.24*	I(1)
DCPS	2.49	-3.87*	I(1)
GNE	-0.36	-6.88*	

*Source: Authors' calculation by using EViews software.*

\*five percent level of significance

The absolute calculated value of GDP is greater than corresponding McKinnon critical values at the level, so null hypothesis has been rejected. It means that there is no unit root for GDP and the data of the variable is stationary. But in the case of FSD, CGSOE, DCPS, and GNE, the absolute calculated values are lower than the corresponding McKinnon critical values at the level, so null hypothesis cannot be rejected. It means that there is unit root for FSD, CGSOE, DCPS, and GNE at the level and again tested at first difference, their absolute calculated value are greater than the corresponding McKinnon critical value at the first difference of the variables, so null hypothesis has been rejected. It denotes that there is no unit root at the first difference. So, we need to convert the non-stationary data of FSD, CGSOE, DCPS, and GNE into stationary by using first difference.

### b. Granger causality test

The output of the Granger causality test has been presented in the Table 3.

**Table 3: Pair-wise granger causality test**

Sample: 1980 2012	Lags: 2	Obs	F-Statistic	Probability
<b>Null Hypothesis:</b>				
DFSD does not Granger Cause GDP		30	1.05787	0.36223
GDP does not Granger Cause DFSD			1.74887	0.19459
DCGSOE does not Granger Cause GDP		30	3.55182	<b>0.04389*</b>
GDP does not Granger Cause DCGSOE			1.62813	0.21643
DDCPS does not Granger Cause GDP		30	1.82923	0.18138
GDP does not Granger Cause DDCPS			1.11662	0.34317
DGNE does not Granger Cause GDP		30	5.07608	<b>0.01412*</b>
GDP does not Granger Cause DGNE			0.28341	0.75560
DCGSOE does not Granger Cause DFSD		30	0.55277	0.58223
DFSD does not Granger Cause DCGSOE			1.40939	0.26304
DDCPS does not Granger Cause DFSD		30	7.03631	<b>0.00377*</b>
DFSD does not Granger Cause DDCPS			2.44923	0.10682
DGNE does not Granger Cause DFSD		30	2.02172	0.15351
DFSD does not Granger Cause DGNE			1.82677	0.18177
DDCPS does not Granger Cause DCGSOE		30	5.47872	<b>0.01064*</b>
DCGSOE does not Granger Cause DDCPS			1.77730	0.18980
DGNE does not Granger Cause DCGSOE		30	0.12957	0.87906
DCGSOE does not Granger Cause DGNE			2.37453	0.11372
DGNE does not Granger Cause DDCPS		30	2.20318	0.13144
DDCPS does not Granger Cause DGNE			1.16947	0.32695

*Source: Authors' calculation by using EViews software.*

\*five percent level of significance

There is no Granger causality between GDP and DFSD, GDP and DDCPS, DFSD and DCGSOE, DFSD and DGNE, DCGSOE and DGNE, and DDCPS and DGNE. But there is unidirectional granger causal relationship from DCGSOE to GDP; DGNE to GDP; DDCPS to DFSD; and DDCPS to DCGSOE at 2 lags. The study shows that credit to government and state owned enterprises as well as gross national expenditure facilitate for enhancing GDP in short run. Similarly, domestic credit to private sectors has short run causal relationship to financial system deposit as well as credit to government and state owned enterprises.

### c. The Johansen cointegration test

The Johansen cointegration test shows that there is cointegration among the variables at most one level of cointegration. The output of Johansen cointegration test has been presented in table 4.

**Table 4: Output of Johansen cointegration test**

<b>Hypothesized No. of CEs</b>	<b>Trace value</b>		<b>Max-Eigen Value</b>	
	<b>Statistic</b>	<b>5% Critical Value</b>	<b>Statistic</b>	<b>5% Critical Value</b>
None*	100.66	68.52	45.45	33.46
At most 1*	55.21	47.21	30.69	27.07
At most 2	24.52	29.68	16.36	20.97
At most 3	8.16	15.41	5.73	14.07
At most 4	2.43	3.76	2.43	3.76

*Source: Authors' calculation by using EViews software.*

\* Five percent level of significance.

The above table shows that trace statistics and Max-Eigen value at none and at most one is greater than its critical value. The Johansen cointegration test suggests that variables are bound together by a long run equilibrium relationship. In such circumstances, the vector error correction model (VECM) can be used.

### d. Vector error correction model

Since there is cointegration among all the variables, so VECM model (also called restricted VAR model) has been applied for finding out whether there is existence of long run association among the variables or not. The following equation has been developed to estimate VECM:

$$D(GDP) = C(1)*( GDP(-1) + 0.411*FSD(-1) - 1.069*CGSOE(-1) - 0.500*DCPS(-1) + 0.464 *GNE(-1) - 47.379 ) \dots \text{(VI)}$$

$$D(GNE) = C(1)*( GNE(-1) + 2.156*GDP(-1) + 0.886*FSD(-1) - 2.304*CGSOE(-1) - 1.077 *DCPS(-1) - 102.126 ) \dots \text{(VII)}$$

Since the coefficient of error correction terms are negative and p-value is also significant (Appendix I & II) in model (VI) and (VII) that suggest for the validity of the long run association among variables. The VEC model (VI) shows that FSD, CGSOE, DCPS, and GNE have long run association to GDP. Similarly, VEC model (VII) refers long run association to GNE through independent variables FSD, CGSOE, DCPS, and GDP. Thus, we can conclude that financial institutions have long run association with economic growth of the nation.

The Wald test statistics has been calculated to find out the short run joint effects of the independent variables to the dependent variables. The outcome of the Wald test statistics has been presented in table 5(1) for model I and table 5(II) for model 2.

**Table 5 (I): Wald test statistics**

Test Statistic	Value	df	Probability
F-statistic	0.728	(8, 18)	0.666
Chi-square	5.824	8	0.667

*Source: Authors' calculation by using EViews software*

**Table 5(II): Wald test statistics**

Test Statistic	Value	df	Probability
F-statistic	2.703	(8, 18)	0.038
Chi-square	21.627	8	0.006*

*Source: Authors' calculation by using EViews software*

\* Five percent level of significance.

The Wald test statistics shows that there is short run joint causality of FSD, CGSOE, DCPS, and GDP to the GNE because the p-value of the test (0.6 percent) is less than 5.0 percent level of significance.

The VEC model (VI) and (VII) has been tested to find out the validity of the model through serial correlation LM test, ARCH test, histogram normality test, and Correlogram Q Statistics that has been presented in Tables and Figure.

**Table 6(I): Breusch-Godfrey serial correlation LMtest**

F-statistic	2.358	Probability	0.127
Obs*R-squared	6.830	Probability	0.033*

*Source: Authors' calculation by using EViews software*

\*five percent level of significance

The Breusch-Godfrey test shows that there is serial correlation in the model (VI) because the p-value of observed R-squared is less (3.3 percent) than 5.0 percent level of significance, however, other tests explain the model is nicely fitted. Though there is serial correlation in the model (VI), can be accepted.

**Table 6(II): Breusch-Godfrey serial correlation LMtest:**

F-statistic	0.801	Probability	0.466
Obs*R-squared	2.730	Probability	0.255

The above table shows the output of Breusch-Godfrey test and it shows that there is no serial correlation in the model (VII) because the p-value of observed R-squared is greater (25.5 percent) than 5.0 percent level of significance. Thus, it explains the validity of the model.

**Table 7(I): ARCH test**

F-statistic	1.368	Probability	0.273
Obs*R-squared	2.762	Probability	0.251

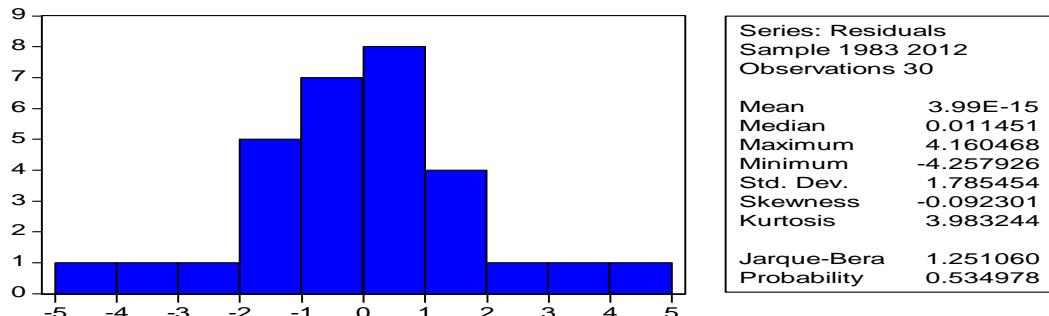
*Source: Authors' calculation by using EViews software*

The above table shows that there is no ARCH effect in the model (VI) because the p-value of observed R-squared is greater (25.1 percent) than 5.0 percent level of significance. The ARCH test explains the validity of the model.

**Table 7(II): ARCH test**

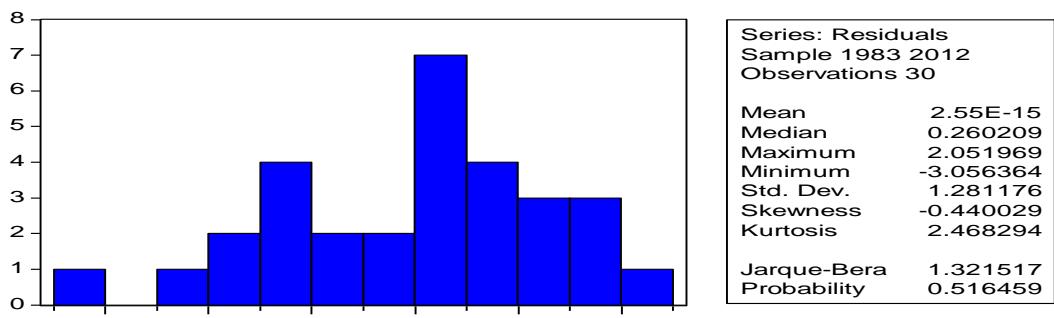
F-statistic	1.453	Probability	0.253
Obs*R-squared	2.916	Probability	0.233

There is no ARCH effect in the model (VII) because the p-value of observed R-squared is greater (23.3 percent) than 5.0 percent level of significance. The ARCH test explains the validity of the model.

**Figure 1(I): Histogram normality test**

*Source: Authors' calculation by using EViews software.*

The histogram normality test finds normality in the model (VI) because the p-value of Jarque-Bera is more (53.5 percent) than 5.0 percent level of significance. Therefore, this test suggests for the validity of the model.

**Figure 1(II): Histogram normality test**

*Source: Authors' calculation by using EViews software.*

The histogram normality test finds normality in the model (VII) because the p-value of Jarque-Bera is more (51.6 percent) than 5.0 percent level of significance. Therefore, this test suggests for the validity of the model.

**Table 8(I): Correlogram Q statistics**

Sample: 1983 2012  
Included observations: 30

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
-0.296	-0.296	2.9017	0.088		
0.078	-0.011	3.1080	0.211		
-0.447	-0.468	10.216	0.017		
0.240	-0.033	12.337	0.015		
-0.051	-0.023	12.436	0.029		
0.120	-0.107	13.009	0.043		
0.046	0.214	13.096	0.070		
-0.039	0.016	13.163	0.106		
-0.082	-0.069	13.471	0.142		
-0.039	0.055	13.546	0.195		
0.057	-0.042	13.710	0.249		
-0.044	-0.135	13.813	0.313		
0.042	0.006	13.911	0.380		
-0.106	-0.175	14.581	0.407		
0.097	-0.018	15.179	0.439		
-0.010	0.105	15.185	0.511		

Source: Authors' calculation by using EViews software.

The Correlogram Q statistics test does not find autocorrelation in the model (VI) because the p-value of Q statistics is more (51.1 percent) than 5.0 percent level of significance. Therefore, this test suggests for the validity of the model.

**Table 8(II): Correlogram Q statistics**

Sample: 1983 2012  
Included observations: 30

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
-0.178	-0.178	1.0445	0.307		
0.014	-0.019	1.0509	0.591		
-0.314	-0.325	4.5543	0.207		
0.087	-0.033	4.8313	0.305		
0.067	0.066	5.0025	0.416		
0.158	0.099	5.9958	0.424		
-0.042	0.036	6.0693	0.532		
-0.281	-0.268	9.5262	0.300		
0.129	0.121	10.286	0.328		
-0.098	-0.112	10.748	0.378		
0.097	-0.124	11.219	0.425		
-0.041	0.041	11.307	0.503		
0.059	0.029	11.505	0.569		
-0.006	0.101	11.507	0.646		
0.083	0.079	11.944	0.683		
-0.095	-0.109	12.566	0.704		

Source: Authors' calculation by using EViews software.

The correlogram Q statistics test does not find autocorrelation in the model (VII) because the p-value of Q statistics is more (70.4 percent) than 5.0 percent level of significance. Therefore, this test suggests for the validity of the model.

## 8. Conclusion and suggestions

This paper has examined the role of financial institutions in economic growth of Nepal. The empirical study shows that there is existence of long run association among the variables of GDP, GCF, CGSOE, DCPS, and GNE. The VECM shows the the long run association of independent variables GCF, CGSOE, DCPS, and GNE to the dependent variable GDP in model (VI) and independent variables GCF, CGSOE, DCPS, and GDP to the dependent variable GNE in model (VII). The study shows that CGSOE and GNE facilitate to enhance GDP in short run. Similarly, DCPS has short run causal relationship to FSD and CGSOE.

There is no Granger causality between GDP and DFSD, GDP and DDCPS, DFSD and DCGSOE, DFSD and DGNE, DCGSOE and DGNE, and DDCPS and DGNE. But there is unidirectional granger causal relationship from DCGSOE to GDP; DGNE to GDP; DDCPS to DFSD; and DDCPS to DCGSOE at two lags. Similarly, Wald test statistics shows that there is no short run joint causality of FSD, CGSOE, DCPS, and GNE to the GDP in model (VI). But in the case of model (VII), Wald test statistics shows that there is short run joint causality of FSD, CGSOE, DCPS, and GDP to the GNE. The study shows that there is a long-run association between financial institutions and economic growth of Nepal. A sound financial system facilitates for economic growth of the nation in long run. Thus, regulatory authority should facilitate to stimulate capital formation and investment in the productive sectors in Nepal.

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## Appendices

### Appendix I

#### Vector error correction model VI

Dependent variable: D(GDP)

Method: Least squares

Sample(adjusted): 1983 2012

Included observations: 30 after adjusting endpoints

$$D(GDP) = C(1)*( GDP(-1) + 0.411*FSD(-1) - 1.069*CGSOE(-1) - 0.500 *DC PS(-1) + 0.464*GNE(-1) - 47.379 ) + C(2)*D(GDP(-1)) + C(3)*D(GDP(-2)) +C(4)*D(FSD(-1))+C(5)*D(FSD(-2))+C(6)*D(CGSOE(-1))+C(7)*D(CGSOE(-2))+C(8)*D(DCPS(-1))+C(9)*D(DCPS(-2))+C(10)*D(GNE(-1))+C(11)*D (GNE(-2)) + C(12)$$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.894	0.637	-2.976	0.008
C(2)	0.466	0.455	1.023	0.320
C(3)	-0.196	0.198	-0.989	0.336
C(4)	0.514	0.568	0.905	0.377
C(5)	-0.235	0.477	-0.493	0.628
C(6)	-1.706	0.854	-1.997	0.061
C(7)	-1.269	0.677	-1.875	0.077
C(8)	-0.636	0.317	-2.007	0.060
C(9)	-0.381	0.248	-1.536	0.142
C(10)	0.119	0.262	0.455	0.654
C(11)	0.0176	0.256	0.069	0.946
C(12)	1.698	0.922	1.842	0.082
R-squared	0.754	Mean dependent var		0.074
Adjusted R-squared	0.604	S.D. dependent var		3.602
S.E. of regression	2.266	Akaike info criterion		4.763
Sum squared resid	92.447	Schwarz criterion		5.324
Log likelihood	-59.450	Durbin-Watson stat		2.391

## Appendix II

### Vector error correction model VII

Dependent variable: D(GNE)

Method: Least squares

Sample(adjusted): 1983 2012

Included observations: 30 after adjusting endpoints

$$\begin{aligned} D(GNE) = & C(1)*(GNE(-1)) + 2.156*D(GDP(-1)) + 0.886*D(FSD(-1)) - 2.304 * CGS\ OE(-1) - \\ & 1.077*D(CPDS(-1)) - 102.126 + C(2)*D(GNE(-1)) + C(3)*D(GNE(-2)) + C(4)*D(GDP(-1)) + \\ & C(5)*D(GDP(-2)) + C(6)*D(FSD(-1)) + C(7)*D(FSD(-2)) + C(8)*D(CGSOE(-1)) + \\ & C(9)*D(CGSOE(-2)) + C(10)*D(DCPS(-1)) + C(11)*D(DCPS(-2)) + C(12) \end{aligned}$$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.783	0.212	-3.697	0.002
C(2)	0.053	0.188	0.282	0.781
C(3)	-0.100	0.184	-0.544	0.593
C(4)	0.943	0.327	2.887	0.010
C(5)	0.456	0.142	3.201	0.005
C(6)	-0.235	0.407	-0.577	0.571
C(7)	-0.045	0.342	-0.132	0.896
C(8)	-1.651	0.613	-2.693	0.015
C(9)	-0.546	0.486	-1.123	0.276
C(10)	-0.507	0.227	-2.229	0.039
C(11)	0.052	0.178	0.293	0.772
C(12)	2.025	0.661	3.062	0.007
R-squared	0.619	Mean dependent var		0.539
Adjusted R-squared	0.386	S.D. dependent var		2.076
S.E. of regression	1.626	Akaike info criterion		4.099
Sum squared resid	47.601	Schwarz criterion		4.660
Log likelihood	-49.493	Durbin-Watson stat		2.267

*Source: Authors' calculation, using EViews software.*

# Introducing pair trading strategy in Nepal

**Hom Nath Gaire, PhD Scholar**

## Abstract

*This paper applies Johansen Cointegration approach to identify cointegrating (long-term equilibrium) relationship among the sectoral indices of NEPSE with an aim of finding cross-sectoral stocks to apply the pairs trading strategies. In addition of gauging long-term equilibrium by cointegration tests, VEC models have been estimated to confirm the causal relationship between the selected pairs and finally Granger causality tests have been performed to identify the direction of causality between the selected pairs. From the pairwise cointegration tests four pairs of sectoral indices (i.e. manufacturing & insurance, finance & trading, manufacturing & banking, and others & trading) found to be co-integrated meaning eligible to be used pairs trading strategy. Further, VECM and Granger causality tests confirm that there is possibility of Pairs trading strategy, in Nepalese stock market, at least among the stocks listed under those 6 sectoral indices considered.*

**Key Words:** Pairs rading strategy, Statistical arbitrage and sectoral indices

**JEL Classification:** F37, G12 and G17

## I. Introduction

Capital market is the mechanism which facilitates the buying and selling of long-term securities (debt and equity) issued by the government and corporation. These securities are the financial assets which have life spans of greater than one year and primarily issued with an aim of mobilising the scattered saving into productive investment. The securities are first issued in the primary market and listed in the secondary market for regular trading.

In the secondary market, under normal circumstances, securities are traded among the third-party investors (other than the issuing entity and regulator) to exchange the ownership entitled. Although the investors might be guided by several motives the principal objective of trading (buy and sell) securities in the secondary market is earning return out of the money (capital) being invested. The returns on investment can be realised in two forms either dividend (amount paid by the issuing entity periodically prorated based on the ownership entitled) or the capital gains (the margin on buying and selling prices of securities and vice versa in case of short-sell).

Most of the investors, especially the institutional investors and professional fund managers including a mass of individual, seem to be motivated to realise the returns on investment in the form of capital gain. This is why regular trading of securities is possible in the stock exchanges. Financial architectures (financial analysts and professional fund/asset managers) have devised many trading strategies with an aim of maximising returns on investment and minimising risks.

The general believe about trading in secondary market is to sell the security which is over-valued and buy the under-valued one. However, it is only possible to say that a security is over-valued or under-valued if the real (absolute) value of the security is identified. The real value can be very difficult to identify. Pair trading is based on the concept of relative pricing, so that the absolute value of the security is not so important. Relative pricing is the idea which assumes that the securities with same context and similar characteristics should be priced more or less the same and behave in same manner. When prices of two similar securities deviated from the historical pattern

(or are different), it is assumed that one security is over-priced with respect to its 'real value' or the other one under-priced. This is where the Pair trading strategy (PTS) comes into picture.

### **1.1 Pair trading**

The unpredictable nature of stock market can make it difficult for investors to decide on a direction (buy or sell) to trade and be consistently correct in prediction. Those who trade without a sound strategy may find themselves spending time and effort without much rather may end up losing money become victims from the stock market volatility. Pair trading, a market neutral strategy, which ignores the direction of overall market, can help reduce portfolio volatility and improve probability of making even in the volatile markets (Evan et.al, 2006). Developed in the mid-1980s by a group of Wall Street Quantitative Analysts (quants) the strategy involves selecting two highly correlated stocks and then matching a long (buy) position in one of the two stocks with a short (sell) position in the other.

In pair trading investors wait for weakness in the correlation between the two stocks, and then go long (buy) on the under-valued while simultaneously going short (sell) on the over-valued. The positions will be closing down when the relationship returns to its historical path. The pair trading strategy is also termed as statistical arbitrage where profits are derived from the difference of the rate of change in prices between the two stocks rather than from the direction they move (Bossaerts and Green, 1989). However, pair trading strategy is not completely risk-free.

### **1.2 Statistical approach**

In pair trading investors would find a mean ratio for the prices of the two selected stocks, buy the stock that is calculated to be under-priced, and sell the stock that is over-priced. The idea is that when the price of a particular stock deviates too much from the calculated mean, there is an opportunity for profits as the price will eventually go back to the mean ratio.

There is no common understanding on the process of selecting pairs of stocks to implement the strategy. Accordingly, there are more than one methods being used in pairs-trading strategy. The three main ones include the Distance Method, the Cointegration Method, and the Stochastic Spread Method (Do, 2006). However, the Cointegration Method has been used in this paper due to its straight-forward properties (Vidyamurthy, 2004) of both to identify pairs, and to generate trade signals.

### **1.3 Cointegrated pairs rading approach**

The notion of cointegration has been widely used in finance and econometrics, particular in constructing statistical arbitrage strategy in the stock market. Some financial instruments of same context move more or less in similar path with each other, because they are driven by similar fundamental (e.g. economic) factors. However, they do not move exactly the same because of their individual technical factors, which can be assumed to be the white noise error term on top of the common movement.

Wilson and Marashdeh (2007) argued that co-movements (cointegration) between stock prices imply market efficiency in long-run equilibrium. Such co-movements, in the short-run, cause arbitrage opportunity and gradually eliminated by arbitrage activities leading the prices into the long-run equilibrium path.

### **1.4 Model:**

There are two popular approaches to establish the cointegration relationship; Engle-Granger methodology (1987) and Johansen methodology (1988). In this paper Johansen methodology has

been applied. According to Johansen, two non-stationary time series  $X_t$  and  $Y_t$  are cointegrated if some linear combination  $aX_t + bY_t$  ..... (1) with  $a$  and  $b$  being constants, is a stationary series.

Let  $X_t$  and  $Y_t$  be two stock prices at time  $t$ .

Assume that  $a\log X_t + b\log Y_t$  ..... (2) is stationary, i.e.  $\log X_t$  and  $\log Y_t$  are cointegrated.

**By Taylor expansion:**

$$a\log X_t + b\log Y_t \cong a \left( \log X_{t0} + \frac{X_t - X_{t0}}{X_{t0}} \right) + b \left( \log Y_{t0} + \frac{Y_t - Y_{t0}}{Y_{t0}} \right) \dots (3)$$

$$= \frac{a}{X_{t0}} X_t + \frac{b}{Y_{t0}} Y_t + a(\log X_{t0} - 1) + b(\log Y_{t0} - 1) \dots (4)$$

Because  $a(\log X_{t0} - 1) + b(\log Y_{t0} - 1)$  is a constant, the stationarity of  $a\log X_t + b\log Y_t$  implies that  $a \frac{a}{X_{t0}} X_t + \frac{b}{Y_{t0}} Y_t$  is approximately stationary,

i.e.  $\frac{a}{X_{t0}} X_t + \frac{b}{Y_{t0}} Y_t$  should exhibit mean-reverting property.

A position with  $c \frac{a}{X_{t0}}$  share of  $X$  and  $c \frac{b}{Y_{t0}}$  shares of  $Y$  for any given value  $c$ , where  $c$  can be considered as the starting initial capital.

**Trading steps:**

1. Investigate possible cointegrated series from pairs of  $\log(P_i)$  based on the Johansen test (typically 5% of pairs).

$$P_i = \sum_{i=0}^n \text{stock prices}$$

2. For each cointegration pairs, check if the current level of the stationary series (i.e.  $a\log X_t + b\log Y_t$ ) is too low/high against its historical mean with 95 percent confidence interval.
3. Enter the trade (i.e. buy/sell  $\frac{a}{X_{t0}}$  share of  $X$  and  $\frac{b}{Y_{t0}}$  share of  $Y$ ) at time  $t_0$  and expect the stationary series ( $a\log X_t + b\log Y_t$ ) to mean-revert back to its historical average level.

## II. Literature review

According to Gatev et al. (2006), the concept of pairs trading is surprisingly simple and follows a two-step process. First, find two securities whose prices have moved together historically in a formation period.

Second, monitor the spread between them in a subsequent trading period. If the prices diverge and the spread widens, short the winner and buy the loser. In case the two securities follow an equilibrium relationship, the spread will revert to its historical mean. Then, the positions are reversed and a profit can be made. The concept of univariate pairs trading can be extended: In quasi-multivariate frameworks, one security is traded against a weighted portfolio of comoving securities. In multivariate frameworks, groups of stocks are traded against other groups of stocks. Terms of reference for such strategies are (quasi-)multivariate pairs trading, generalized pairs trading, or statistical arbitrage. We further consider all these strategies under the umbrella term of

“pairs trading,” since it is the ancestor of more complex approaches (Vidyamurthy, 2004; Avellaneda and Lee, 2010).

The most cited paper in this domain is published by Gatev et al. (2006), hereafter GGR. A simple yet compelling algorithm is tested on a large sample of U.S. equities, while rigorously controlling for data snooping bias. The strategy yields annualized excess returns of up to 11% at low exposure to systematic sources of risk. More importantly, profitability cannot be explained by previously documented reversal profits as in Jegadeesh (1990) and Lehmann (1990) or momentum profits as in Jegadeesh and Titman (1993). These unexplained excess returns elevate GGR’s pairs trading to one of the few capital market phenomena that have stood the test of time 1 as well as independent scrutiny by later authors, most notably Do and Faff (2010, 2012).

Available literatures show that various authors have conducted empirical studies about pairs trading strategy where they have tested applicability, effectiveness and efficiency of the strategy in different markets worldwide. Majority of the researchers have focused on the cointegration approach of pair trading strategy using different econometric methods.

According to Bossaerts and Green (1989) and Jagannathan and Viswanathan (1988), the pairs trading strategy may be justified within an equilibrium asset-pricing framework with nonstationary common factors. If the long and short components fluctuate with common nonstationary factors, then the prices of the component portfolios would be co-integrated and the pairs trading strategy would be expected to work. Nevertheless, the cointegration method has its limitations in real practice and it is unlikely that the stocks’ factor exposures will be perfectly aligned (Vidyamurthy, 2004).

Evan et.al., (2006) reported that pairs trading was able to produce excess returns of up to 11% annually (before costs) for self-financing pairs in the US stock market over the period of 1962 to 2002. The authors attribute the excess returns to an unknown systematic risk factor not yet identified. They support this view by pointing out that there is a high degree of correlation between the returns to portfolios of non-overlapping pairs.

Elliot et.al. (2005) modelled the spread as a random variable with mean-reverting properties and concluded that it is possible to forecast time to convergence and probabilities for further divergence. Although the paper was purely theoretical and offers no empirical analysis of the approach. Similarly, Lin et.al., in their paper “Loss protection in pairs trading through minimum profit bounds: A cointegration approach” (2006), present a variant of the cointegration approach suggested by Vidyamurthy (2004). According to the authors, this approach was able to meet the necessary conditions for a trade to deliver a minimum profit over trading costs.

Following the approach outlined by Evan et al. (2006) Engelberg et.al. (2009) authors document significant excess returns with the cointegrated pairs trading. The findings reported that the return to a trade was sensitive to the time passed between divergence and convergence. Do & Faff (2010) have attempted to replicate the results found by Evan et al., (2006) by using the same dataset as in the original study. Their results did agree with those found in the original study with only minor discrepancies. In addition, the authors expand the data sample to include observations up to the first half of 2008 and subsampled the period from 2003 to 2008. In the subsample it was noted that there seems to be an increased risk of non-convergence in this sub-period i.e. the spread continues to widen once the position is opened.

Bowen et.al., (2010), by using high frequency data, have found a pairs trading strategy does not imply that the market is inefficient, rather it says that certain assets are weakly redundant, so that any deviation of their price from a linear combination of the prices of other assets is expected to be temporary and reverting. According to Jhang (2012), the world of stocks and securities is filled

with uncertainties and risks. However, many investors see potential to make profits in this stock market with gathered information and strategies and one of such strategies in stock trades is pairs trading.

Following a cointegration approach Hoel (2013) tested the performance of a pairs trading strategy over the years 2003 through 2013 in the Norwegian stock market. The study shows that this implementation would have resulted in large losses, both cumulative and in most sub-periods. However, the author noted that it might be attributed to changes in fundamental factors governing the relationships between stocks.

According to Gundersen (2014), once the pairs are matched can automatically be traded based on a set of trading rules. The author conducted an empirical analysis using high frequency intraday data from across the first quarter of 2014 and found that the strategy is able to generate positive risk adjusted returns, even after controlling for moderate transaction costs and placing constraints on the speed of order execution.

Using high frequency data from the US market Miao (2014) shows that pairs trading during 2012 and 2013 were extremely lucrative. The author reports that the strategy outperformed the S&P 500 by 34 % over a 12-month trading period (before costs). The pairs formation procedure is divided in to two steps; in the first step, potential pairs are pre-selected based on their correlation coefficients. In the second step, a test for cointegration is applied to identify the best pairs. The selected pairs are then subsequently traded when deviations from the estimated relationship arise.

### **III. Data and methodology**

This paper is concentrated on the secondary market of Nepal and has made an attempt to test pairwise cointegration (long run equilibrium relationship) among sectorial indices with an aim of exploring possibilities of pairs trading in Nepal. For this, monthly closing value of sectorial indices under Nepal Stock Exchange have been collected from January 2006 to December 2017. The data source of sectorial indices is various yearly and monthly reports of Nepal Stock Exchange (NEPSE).

There are total 11 sectoral (sub) indices under NEPSE index representing various companies of those respective sectors. However, due to insufficient data across the sample period three sectoral indices namely Hydropower, mutual fund and micro finance are excluded in this study. A brief of the remaining eight sectoral indices is given below.

**Banking:** - This sub-index measures the performance of the stocks of commercial banks listed in the NEPSE.

**Development bank:** - This sub-index measures the performance of the stocks of development banks listed in the NEPSE.

**Finance:** - This sub-index measures the performance of the stocks of finance companies.

**Hotels:** - This sub-index represents tourism sector of Nepal which captures the stocks of the hotels listed in the NEPSE.

**Insurance:** - This sub-index is also related to the financial sectors of Nepali economy capturing the stocks of insurance companies.

**Manufacturing and processing:** - This is the only sub-index which represents the manufacturing industries listed in the NEPSE.

**Trading:** - This sub-index represents the companies of trade and commerce sectors listed in the NEPSE.

**Others:** - Under this sub-index companies from telecom, film and entertainment, and some other categories are listed.

## Data analysis tools

As this study is based on the time series data of sectoral indices of Nepalese secondary market, it is important to check whether a series is stationary or not before using in any analysis. A series is said to be stationary if the mean and auto covariance of the series do not depend on time. Any series that is not stationary is said to be non-stationary and has a problem of unit root.

Many economic and financial time series exhibit trending behaviour or non-stationarity in the mean. Leading examples are stock prices, gold prices, exchange rates and the levels of macroeconomic aggregates like real GDP.

## Unit root test

A unit root is a feature of processes that evolve through time that can cause problems in statistical inference involving time series models. The formal method to test the stationary of a series is the unit root test.

Dickey and Fuller (1979) have explained the following form of basic unit root tests.

Consider a simple autoregressive (AR) 1 process:

Where,  $x_t$  are optional exogenous regressor, which may consist of constant, or a constant and trend.

Series Y is a non-stationary series if  $|\rho| \geq 1$ , and the variance of Y increases with time and approaches infinity. Series Y has a trend stationary process if  $|\rho| < 1$ . Thus, the hypothesis of trend Stationarity can be evaluated by testing whether the absolute value of  $\rho$  is strictly less than one or not. The standard Dickey and Fuller (DF) test is carried out by subtracting  $Y_{t-1}$  in both side of the equation 5.

Where,  $\alpha = \rho - 1$ .

$$H_0: \alpha = 0 \text{ and } H_1: \alpha < 0$$

The hypothesis can be evaluated using the conventional t-ratio for  $\alpha$ .

$t_\alpha = \frac{\hat{\alpha}}{(S.E(\hat{\alpha}))}$  Where,  $\hat{\alpha}$  = Is the estimated  $\alpha$ , and S.E ( $\hat{\alpha}$ ) is the coefficient standard error of  $\hat{\alpha}$ .

The above Dickey-Fuller unit root test is valid only if the series is an AR (1) process. If the series is correlated at higher order lags, the assumption of white noise disturbances  $\epsilon_t$  is violated. In order to cope with this Augmented Dickey-Fuller (ADF) test has been constructed with a parametric correction for higher-order autocorrelation by assuming that the series Y follows an AR (p) process. Adding p lagged difference terms of the dependent variable Y the ADF test follows the following process.

$$\Delta Y_t = \alpha Y_{t-1} + X'_t \delta + \beta_1 \Delta Y_{t-1} + \beta_2 \Delta Y_{t-2} + \dots + \beta_p \Delta Y_{t-p} + \vartheta_t \dots \quad (7)$$

This augmented specification is then used to test the above-mentioned hypothesis using the t-ratio.

## Co-integration test

Modelling of a one non-stationary time series on another non-stationary time series may produce a spurious regression. Johansen (1988) established that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be co-integrated. Economically speaking, two variables will be co-integration if they have a long term or equilibrium relationship between them.

The purpose of the co-integration test is to determine whether the groups of non-stationary series are co-integrated or not. The presence of a co-integrating relation forms the basis of Vector error correction model (VECM) specification. Here, VAR based co-integration tests are performed using the methodology developed by Johansen.

Consider a VAR of order (p):

$$Y_t = A_1 Y_{t-1} + \dots + A_p Y_{t-p} + BX_t + \epsilon_t \dots (8)$$

Where,  $Y_t$  is a  $k$ -vector of non-stationary  $I(1)$  variables,  $X_t$  is a  $d$ -vector of deterministic variables, and  $\epsilon_t$  is a vector of innovations. We may rewrite this VAR as:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + BX_t + \epsilon_t \dots \dots \dots \dots \dots \dots \dots \quad (9)$$

Where:  $\Pi = \sum_{i=1}^p A_i - I$  and  $\Gamma_i = -\sum_{j=i+1}^p A_j$

Granger's representation theorem asserts that if the coefficient matrix  $\Pi$  has reduced rank  $r < k$ , then there exist  $k \times r$  matrices  $\alpha$  and  $\beta$  each with rank  $r$  such that  $\Pi = \alpha\beta'$  and  $\beta'Y_t$  is  $I(0)$ .

Here,  $r$  represents the number of co-integrating relations,  $k$  is the number of exogenous variable, and each column of  $\beta$  is the co-integrating vector. The elements of  $\alpha$  are known as the adjustment parameters in the VAR model. Johansen proposes two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the  $\Pi$  matrix: the trace test and maximum Eigen value test, shown in the equations below respectively.

$$j_{\text{trace}} = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i) \text{ and } j_{\text{max}} = -T \ln(1 - \hat{\lambda}_i)$$

Here  $T$  is the sample size and  $\lambda_i$  is the  $i^{\text{th}}$  largest correlation. The trace test tests the null hypothesis of  $r$  co-integrating vectors against the alternative hypothesis of  $n$  co-integrating vectors. The maximum Eigen value test the null hypothesis of  $r$  co-integrating vectors against the alternative hypothesis of  $r+1$  co-integrating vectors.

To interpret the pairs as co-integrated prices, it is assumed that for  $n > k$  (number of variables more than number of parameters in an equation), there are co-integrating vectors that have only two non-zero coordinates. In that case, the sum or difference of scaled prices will be reverting to zero and a trading rule could be constructed to exploit the expected temporary deviations.

#### IV. Results and discussion

### Unit root test

The ADF test has been performed in this study to examine the unit root (Stationarity) feature of time series of sectoral indices being studies. From the tests it has been found that all the series of sectoral indices were non-stationary at level. However, all the series have become stationary at first difference. This has been proved as the null hypotheses that there is unit root in the data series

were rejected at 5 % level of significance indicated by probabilities (Mackinnon P-value) of each variable. The results of the ADF tests have been presented in the Table 1.

**Table: -1 Augmented Dickey-Fuller (ADF) tests**

Sub-Indices	Level		First Difference	
	t-stat	p-value*	t-stat	p-value*
Manufacturing	0.2874	0.9984	-8.8015	0.0000
Commercial Banks	-1.5158	0.8189	-8.4126	0.0000
Development Banks	-1.8045	0.6966	-7.2822	0.0000
Finance	-1.8677	0.6649	-5.1347	0.0000
Insurance	0.3134	0.9985	-3.2890	0.0180
Hotels	-1.3193	0.8783	-8.2509	0.0000
Trading	-1.746	0.7245	-11.5316	0.0000
Others	-2.796	0.2018	-17.4726	0.0000

\* Mackinnon (1996) one sided p-values.

As all the data series have become stationary at first difference further analysis is permitted.

#### Pairwise cointegration test

The cointegration tests have been performed to gauge the long run (cointegrating) relationship among the sectoral indices of NEPSE. This would help investors/traders finding cross-sectoral pairs of stocks and implement the Pairs trading strategy (PTS). The results are summarised and presented in the following Table 2.

**Table: -2 Pair wise cointegration tests**

Pairs	Cointegrating Relations		Decision
	Trace Test	Max-Eigen value Test	
Banking & Dev. Bank	0	0	No Cointegration
Banking & Insurance	0	0	No Cointegration
Banking & Others	0	0	No Cointegration
Banking & Trading	2	0	No Cointegration
Banking & Finance	0	0	No Cointegration
Banking & Hotels	0	0	No Cointegration
Dev. Bank & Finance	0	0	No Cointegration
Dev. Bank & Hotel	0	0	No Cointegration
Dev. Bank & Insurance	0	0	No Cointegration
Dev. Bank & Others	0	0	No Cointegration
Dev. Bank & Trading	2	0	No Cointegration
Finance & Hotels	0	0	No Cointegration
Finance & Insurance	0	0	No Cointegration
Finance & Others	2	0	No Cointegration
Hotels & Insurance	0	0	No Cointegration
Hotels & Others	0	0	No Cointegration
Hotels & Trading	0	0	No Cointegration

Insurance & Others	2	0	No Cointegration
Insurance & Trading	0	0	No Cointegration
Manufacturing & Others	2	0	No Cointegration
Manufacturing & Dev. Bank	1	0	No Cointegration
Manufacturing & Hotels	2	0	No Cointegration
Manufacturing & Finance	1	0	No Cointegration
Manufacturing & Trading	1	0	No Cointegration
<b>Manufacturing &amp; Insurance</b>	<b>2</b>	<b>2</b>	<b>Cointegrated</b>
<b>Finance &amp; Trading</b>	<b>2</b>	<b>2</b>	<b>Cointegrated</b>
<b>Manufacturing &amp; Banking</b>	<b>1</b>	<b>1</b>	<b>Cointegrated</b>
<b>Others &amp; Trading</b>	<b>1</b>	<b>1</b>	<b>Cointegrated</b>

*Source: Author's calculations*

The results of pairwise cointegration tests reveal that of the 28 pairs 4 pair are cointegrated meaning there is long run equilibrium relationship between those sectoral indices. The result of Trace and Maximum Eigenvalue tests indicate that there are two cointegrating relations between Finance and Trading indices as well as Manufacturing and Insurance indices. In the meantime, one cointegrating relation has been found between the pairs of Manufacturing and Banking, and Trading and Others indices. This was confirmed when the null hypotheses of no cointegrating relation were rejected at 5 % level of significance. Since the long-run equilibrium relationship (cointegration) between the four pairs is confirmed, the investors/traders now can think about developing pairs trading strategy on cross-sectoral stocks of those four sectors.

### Vector error correction (VEC) model

The term error-correction relates to the fact that last-periods deviation from a long-run equilibrium, the error, influences its short-run dynamics. The Error Corrections Model (ECM) estimates the speed at which a dependent variable returns to equilibrium after a change in other variables. Here, VECMs have been estimated to reaffirm the long-term causal association between the paired sub-indices that are cointegrated to each other. The statistically significant results are given below.

**Table-3: VECM estimates of cointegrated pairs**

Variables (Pairs)	Coefficient	Stand. Error (S.E)	t-stat. [t]	Result
Manufacturing & Insurance	0.0578	0.0241	2.3986	Significant
Manufacturing & Finance	-0.0735	0.0964	0.7626	Significant
Manufacturing & Others	-0.0911	0.0474	1.921	Significant
Insurance & Finance	-0.0695	0.4565	1.5231	Significant
Insurance & Banking	-1.3228	0.4908	2.6949	Significant
Insurance & Others	-0.6502	0.2247	2.8934	Significant
Finance & Banking	0.0751	0.1139	0.6587	Significant
Finance & Others	0.0586	0.0522	1.1242	Significant
Trading & Manufacturing	0.0228	0.0313	0.7308	Significant
Trading & Insurance	-0.0031	0.0073	0.4348	Significant
Trading & Finance	-0.0033	0.0291	0.1131	Significant
Trading & Others	-0.004	0.0143	0.2813	Significant
Banking & Others	-0.1751	0.0651	2.6903	Significant

*Source: Author's Calculation*

## Granger causality test

Here, Granger causality tests have been performed to check the causal relationship among the cointegrated sectoral indices. This would identify whether any of the indices granger causes others or being caused by others and vice-versa. This would further enhance the possibility of developing profit-making pairs among the stocks of the identified sectors. Here Block Exogeneity Wald (VAR Granger causality) tests is used for cointegrated pairs. The results have summarized and presented in the following Table 4.

**Table-4: Results of pairwise granger causality tests**

Null Hypothesis	X2 stats	P-Values	Decision
Banking does not granger cause Others	16.7276	0.0000	Rejected*
Manufacturing does not granger cause Others	5.4983	0.0190	Rejected**
Trading does not granger cause Others	4.6514	0.0310	Rejected**
Insurance does not granger cause Others	10.6293	0.0013	Rejected*
Trading does not granger cause Banking	5.7070	0.0176	Rejected**
Finance does not granger cause Banking	8.3945	0.0038	Rejected*
Finance does not granger cause Trading	3.6010	0.0577	Rejected***

*Source: Author's calculation*

\* 1% level of significance, \*\*5% level of significance and \*\*\*10% level of significance

The above table depicts that there is causality (cause and effect relationship) among seven pairs. This is confirmed as the p-values of corresponding  $\chi^2$  statistics of those pairs have rejected the null hypotheses. It is found that the Others Index was caused by four indices namely--Insurance, Banking, Manufacturing and Trading-- as the P-value of corresponding  $\chi^2$  statistics have rejected the null hypothesis that there is no Granger causality. The Trading index was caused by only Finance index.

Mixed results have been found in the case of indices under the domain of financial sector. The Banking (Commercial banks) Index was caused by two indices namely—Trading and Finance-- as the P-values of corresponding  $\chi^2$  statistics have rejected the null hypothesis. However, no causality found between Insurance, Development Banks and Banking Indices meaning none of those indices cause each other. Surprisingly, the Banking Index does not cause any indices except the Others Index. It is quite surprising because the common believe that Banking (commercial banks) sector has been dominating the stock market and the Banking sub-index drives the rest of the sectoral sub-indices is no more valid now.

The Manufacturing Index has no causality with any rest of the indices

except the Others Index. Since the causality moves from Manufacturing to Others it can be concluded that the Manufacturing has not been affected by the rest of the sectoral indices. It is quite natural since there are very few manufacturing companies listed in the NEPSE and dominated by a single company, which is also driven by its own strong fundamentals.

## V. Summary and findings

The pairs trading strategies also called statistical arbitrage strategies rely on the construction of mean-reverting spreads (ratio) between prices of two stocks with a certain degree of predictability. The concept is based on the assumption that a linear combination of two stocks can be weakly dependent which may be interpreted as a co-integrating vector that can be partitioned in two parts, such that the two corresponding portfolios are priced within a weakly dependent error of another

stock. However, it is important to recognise the possibility of spuriously correlated prices, which are not de facto co-integrated.

In this background, this paper applies Johansen Cointegration approach to identify cointegrating (long-term equilibrium) relationship among the sectoral indices of NEPSE with an aim of finding cross-sectoral stocks to apply the pairs trading strategies. In addition of gauging long-term equilibrium by cointegration tests, VEC models have been estimated to confirm the causal relationship between the selected pairs and finally Granger causality tests have been performed to identify the direction of causality between the selected pairs.

From the pairwise cointegration tests four pairs of sectoral indices (i.e. manufacturing & insurance, finance & trading, manufacturing & banking, and others & trading) found to be co-integrated meaning eligible to be used pairs trading strategy. Those four indices were cross-paired (turned to be 16 pairs) and tested with VECM, which confirmed that of the total 16 cross-sectoral pairs 13 pairs had long-run causal association. Finally, Granger causality tests confirmed that of those 13 pairs 6 pairs really determined by each other's behaviour. Thus, it can be concluded that there is possibility of Pairs trading strategy at least among the stocks listed under those 6 sub-indices considered in the study. The implication of the finding is that it is important to closely monitor the mean ratio of the prices of identified pairs of stocks to find out the appropriate time for entry and exit of the trade.

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- [www.nepalstock.com.np](http://www.nepalstock.com.np)

# Is there any Prospect of the Book Building Pricing Mechanism for IPOs in Nepal?

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## Abstract

*In this paper the global book building mechanism is highlighted in light of the regulatory framework and discussion is also made regarding the applicability of the mechanism in Nepalese context. Book building has emerged as one of the widely used pricing mechanisms and selling IPOs around the world including our Asian neighbours. It reveals that SEBON seems to be adopting free pricing with some cap before introducing the book building mechanism. Since introducing book building, it was banned in India; temporarily postponed in Bangladesh; and in 2017, Inbox Business Technologies---a firm, postponed the book-building process in Pakistan keeping in view political uncertainly. Therefore, we must learn that which pricing mechanism in IPOs produces a good result in Nepalese context and not to be too fanatical about IPO mechanisms. As being a WTO member, however, Nepal cannot be a lonely market in a globalised world. In such a situation, it is suggested that SEBON should introduce book building mechanism after maintaining informational and other efficiencies in the securities market of Nepal.*

**Keywords:** IPOs, fixed pricing, book building, auctions, Securities Board of Nepal (SEBON), small investors' protection

## The Context

As a part of securities market, primary market is a market for issue of new securities. It is also known as new issue market through which funds are raised. The first time equity share issue is known as Initial Public Offerings (IPOs). After IPOs, suppose the company again wants to issue equity shares or debt instruments to the public then it will be called as Further Public Offerings or Follow on Public Offerings (FPOs). Initial Public offerings (IPOs), is one of the basic components of a securities market. IPOs, also known as 'going public' or 'floating' or 'offering' is the act of first sale of a public company's or newly established public company's common stocks or equity shares or shares to the public. Rashida (2013) states that IPOs are often made by smaller, younger companies seeking capital to expand, but can also be done by privately owned companies looking to become publicly traded. IPOs generally involve one or more investment banks known as "underwriters". The company offering its shares, called the "issuer", enters a contract with a lead underwriter to sell its shares to the public. The underwriter then approaches investors with offers to sell these shares.

During most popular means of raising money, i.e., IPOs and FPOs, the public limited company offers its equity shares to the public either at fixed price or offers a price range so that the right price can be decided by the investors. Fixed price is the price in which the issuer decides and mentions it in the offer document. Book building is essentially a process used by going public companies to raise capital through book building method---a popular means of raising capital in view of aiding price and demand discovery. It is an interactive process. In other words, the mechanism of offering equity shares for both IPOs and FPOs with a price range is referred to as book building method. The issuer who is planning to float nominates a lead merchant banker

registered under book building regulation as a 'book runner'. At the same time, the numbers of securities are to be subscribed were specified by the issuer.

As documented by Garg (2013), given that in general, the word "Book building" is a method of marketing the shares of a company whereby the quantum and the price of the securities to be issued will be decided on the basis of the 'bids' received from the prospective shareholders by the lead merchant bankers. According to this method, share prices are determined on the basis of real demand for the shares at various price levels in the market. Besides fixed pricing and book building, the auction approach has also been used to price the securities internationally. Book building and auction comes under free pricing method in IPOs. Globally, book-building is the pricing method of choice (Ayala, 2016).

Three types of investors can be found in a book building issue (Garg, 2013, p.96). (i) retail individual investor; (ii) non-institutional investor; and (iii) qualified institutional buyers. Book building is the process of price discovery, i.e., there is no predetermined price for the equity shares of both IPOs and FPOs. It has been practicing in developed countries and has recently been making inroads into emerging markets as well. The book building mechanism has not been introduced yet in the Nepalese securities market but the applicability of the mechanism that appeared in the developed and emerging markets is yet to be existed in the Nepalese market. In this paper, mechanism, method, process and approach have been used interchangeably to indicate book building mechanism.

## **Objectives**

- (i) Describe the book building mechanism around the world in light of the regulatory framework and other practices.
- (ii) Identify the applicability of the book building method in Nepalese securities market.

## **Review of relevant literature on the study**

Boyan and Szentes (2007) argued that during book building road shows are used to elicit bids for the company's shares at a pre-specified price. They compared two IPO mechanisms, auctions and book building, and argued that book building drives out auctions because it discloses more information, leading to adverse selection into the auction market. Thus, they have explained that why auctions are not used much in the market for IPOs. In most markets, including the U.S., auctions are rarely used. Jagannathan, Jirnyi and Sherman (2010) state that when Margaret Thatcher, Prime Minister of the UK, began privatising British companies, she set off major changes around the world in government, in industries and in IPO methods. Before then, the IPO method in most countries outside the US was fixed price public offer.

There are two notable patterns. First, the book building method was once rare outside the US but is now common. Second, auctions have been tried in more than 25 countries but are rare today. Jagannathan et.al. (2010, p.3) also noted that hybrid book building/auctions on the exchange are used in Chile because of regulations, but the offer price is set through book building. In Japanese IPO context, Kutsuna and Smith (2004) found a small but statistically significant increase in initial returns under book building, and also found that a wider range of companies, including younger start-ups, were able to go public under book building. They found that book building method is widely used in Japan as IPO mechanism.

The currently applied major offering method of shares in China is the online/offline book building, which was introduced on 1<sup>st</sup> January 2005. For online/offline book building issuer set the price range, then the strategic, institutional and individual investors subscribe online and offline. In China, individual investors cannot participate off line; and for strategic and institutional investors,

who subscribed on/offline, cannot participate though the other platform. The on/offline book building method is similar with book building in mature market like that of USA and UK (Xu 2013, p.17). However, small and mainstream-excluded investors have not only been benefited from China's securities market through state-controlled mechanism but also reduced the income disparity in the country which cannot be found in the mature markets. Anderson in 2000 explained, "major investors' concerns in Chinese securities markets include honest information disclosure, corporate governance, and effective regulation of listed companies and financial intermediaries" (as cited in Shi, 2007, p. 451).

Like issuance of equity shares, generally primary debt issuance in the international market features a shorter book building process than in China and fewer restrictions on the flow of information, subject to the general legal framework on insider information (ICMA, 2015, p.6). Kucukkocaoglu and Sezgin in 2007 found that book building was considered as the most effective method because it resulted in more efficient pricing for sellers compared to fixed pricing and auctions almost half of the studies listed in their research (As cited in Linh, Yixia and Chien 2012, p.121).

Ayala (2016) found that almost all capital raised through IPOs in the Philippines is done using a book-building pricing method, however a significant number of IPOs still occur using non-book-building methods. IPOs that use book built pricing in the Philippines actually have a lower total issue cost as a percentage of the total issue size compared to issuers who use non-book-building methods. In this way, book building is a popular means of IPO mechanisms in Philippines.

Bora, Adhikary and Jha (2012) examined the importance of book building method in issuing shares in India, estimate and compare immediate and long term performance of the issues made through book building and fixed pricing method, examine the size of the companies that opted for book-building method, and examine whether book building method is less under-pricing than fixed price method. In India, the first company to use book building method was ICICI for its INR 1000 crores bond issue in April 1996 followed by INR 4,323 crores Larsen & Toubro board issue and INR 5,878 crores TISCO bond issue (Bora et.al. 2012, p.109) . They further account in their article that even today the fixed Price route of issuing shares is still available to the issuers in India. Additionally, Kshirsagar (2016) analysed the process of book building in Indian context and found that the method provides an opportunity to the market to discover price for the securities which are on offer.

Rashida (2013) assessed the IPO procedure, particularly book building method in Bangladesh and used both primary and secondary data in preparing the report. The focus of the study was book building method in the security market of Bangladesh and discussed about its problems created by manipulators. In Bangladesh book building approach was first introduced and then temporarily postponed.

An empirical study was conducted by Asad Ullah Gondal in Pakistan determines whether fixed price offer mechanism or book building offer mechanism is useful for pricing of the IPOs [As cited in Securities and Exchange Commission of Pakistan ( SECP), 2017]. The findings of the study were: Fixed price mechanism is a traditional method of pricing the IPOs. In newly adopted book building mechanism, the book runner collects investor's indications in the issue, settle at a price called strike price and then allocation of the securities is made among successful investors. Book building mechanism usually results in additional aggressive pricing as compared to the traditional fixed price mechanism due to its inherent factor of price discovery by well-informed institutional and high net worth investors (p.19).

In Nepalese context, Vaidya (2012) reviewed the IPO process in Nepal and concentrated to introduce free pricing mechanism in Nepalese context. Emphasising on free pricing mechanism, he argued that fixed pricing has to be set at not more than per share net worth value. Because of such provisions in fixed pricing mechanism, it is very likely that the securities are underpriced, which is commonly known as leaving money on the table. And this is a cost to the issuer and if such cost is high, the incentive for the issuer to take such cost without any other offsetting benefit would be null. This has been one of the reasons pointed out why companies, which are not mandatory required to come to public, are not eager to come to public in Nepal (p. 3). It is already stated that book building and auction comes under free pricing method in IPOs. However, no studies especially on book building have been carried out yet in Nepalese context. This preliminary study is perhaps the first study of its kind in Nepal to date.

### **Book building: first introduced years in various countries around the world**

Jagannathan et.al. (2010) mention the “first introduced” years of book building in the various countries around the world are the earliest years that they were able to find but may be later than the actual year of first use. Commencing years of book building approach and country-name as listed out by the authors are stated below: Book building method begins in the USA and the Canada early than elsewhere in the world. Czech Republic 2004; Finland 1993; France 1993; Germany 1995; Greece 1994; Hungary 1995; Ireland 1992; Italy 1992; Netherlands 1994; Norway 1995; Poland 1995; Portugal 1995; Spain 1993; Sweden 1994; Switzerland 1995; United Kingdom 1992; Australia 1993; New Zealand 1997; Argentina 1993; Brazil 1992; Peru 1996; Egypt 2000; Kenya 2008; South Africa 1994 and Turkey in 1997 (p.5). Additionally, Sherman (2004) pointed out in a study that IPO auctions were tried in Italy, the Netherlands, Portugal, Sweden, Switzerland and the U.K. in the 1980s, and Argentina and Turkey in the 1990s, but they were abandoned in all of these countries before book building became popular.

### **Book building: first introduced years in Asia**

In 2005, the book building pricing mechanism was introduced for Chinese IPO pricing regulation by the China Securities Regulatory Commission (CSRC), which is considered as a milestone of transforming from fixed to book building in this country. In India, book building was first allowed in the 1990s but was not popular for many years. After regulatory changes, book building became more popular there, but in 2005 the Indian regulator began mandating pro-rata allocation among bidders, thus effectively banning book building. Eventually, the book building mechanism was resumed in India after some time. In Indian IPOs, the issue manager sets a price band for the issue, and investors have to submit bids with prices falling within that price band (Jagannathan et.al. 2010, p.4). Since its inception till date, a number of companies have adopted book building as an effective tool for price discovery and even today the fixed price route of issuing shares is still available to the issuers in India.

In Bangladesh, the Bangladesh Securities and Exchange Commission (BSEC) introduced book-building method on 5<sup>th</sup> March 2009 to ensure fair price in the initial public offerings (IPOs) for the entrepreneurs whose companies will go public (Rashida, 2013, p.173). It is almost identical to the book building mechanism introduced in neighbouring India more than two decades back. However, the Bangladeshi government has decided to postpone temporarily book building method for price fixing of shares to protect diverting off money from the stock market through over-

pricing<sup>1</sup>. Likewise, in Pakistan book building was started as another mode of offering shares to investors since the promulgations of Book Building Regulation in 2008. In 2017, Inbox Business Technologies--- a firm, has, however, postponed the book-building process in Pakistan keeping in view political uncertainty. Except the typical case, Pakistan has been practicing book building approach successfully.

The “first introduced” years of book building in the various countries around the world are the earliest years that they were able to find but may be later than the actual year of first use as mentioned by the Jagannathan and others. For example in Japan book building was introduced in 1997; Indonesia 2000; Korea 1997; Malaysia 2002; Philippines 1998; Singapore 1999; Thailand 1994 (Jagannathan et.al. 2010, p.5). However, many countries around the world have used hybrids – combinations of any two of the three methods. There have been hybrid auction/public offer and auction/book building IPOs, but the most common combination is book building/public offer. For most hybrids, book building (or sometimes an auction) is used to set the price and to allocate shares to institutional and foreign investors, while a fixed price public offer tranche is reserved for local retail investors that do not participate in the price-setting process (p.3). Sherman (2004) pointed out in a study, “IPO auctions were tried in Malaysia, Singapore, Taiwan in the 1990s, but they were left in all of these countries before book building became popular.”

Explaining the context of book building as IPO mechanism in the Middle East, Azzam (2008) states, “although common in developed markets, book building is still a novelty in the Middle East. With the exception of the Dubai International Financial Exchange (DIFX), the Cairo and Alexandria stock exchange, and the Saudi stock market, the normal practice so far has been to float companies at a fixed IPO price”.

## **Methodology**

This paper is mainly based on secondary data which were collected from various journals, periodicals, textbooks, websites and publications published by various institutions. Besides secondary data, some already published interviews, reports have been employed as secondary sources of information and an informal chatting were also made with some finance academicians and practitioners as primary sources of information. In this paper, descriptive research technique has been used as a major part of the research; no quantitative tools have been employed. As Keegan (2009) states that qualitative research is primarily concerned with meaning rather than measuring (p.11). The methodology of this paper is partly influenced by the work of Rashida (2013); Garg (2013); Kshirsagar (2016); and Jagannathan, Jirnyi and Sherman (2010).

## **Discussion and analysis**

In this section, this paper briefly highlights the book building practices and its regulatory provisions in the neighbouring countries along with the Nepalese context.

### **Regulatory provision of book building in China**

Ma and Faff (2007) noted that there are three pricing and allocation mechanism in the Chinese IPO market: fixed pricing, book building and auction (as cited in Hu, Jiang, Ning and McInish, 2017, p.6). History indicates that Chinese securities market started in 1990s with the fixed pricing dominance in the IPOs. The origins of China's "stock system," however, can be traced to the early 1980s. The Shanghai stock exchange, the larger and more dominant exchange,

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<sup>1</sup>"Government to postpone book building for price fixing", *The Financial Express*, January 20, 2011, Electronic copy available at:[www.bdipo.com/blog/govt-to-postpone-book-building-for-price-fixing](http://www.bdipo.com/blog/govt-to-postpone-book-building-for-price-fixing), accessed on February 12, 2018.

began operations on 19 December 1990. The Shenzhen exchange formally opened on 4 July 1991 (Mookerjee and Yu, 1995, p.24). In China, China Securities Regulatory Commission (CSRC) regulates securities markets.

The China's CSRC regulates both the pricing and the supply of IPO shares. Occasionally, the CSRC freezes IPO offerings to stabilise the market. Hu, Jiang, et.al., 2017) states that the CSRC set a cap for the offering price derived from the P/E multiplier method. Typically, a multiplier ranging from 15 to 20 is applied to the forecasted earnings to arrive at a price estimate. It takes time for IPO approval (p.7). Through a Notice it was regulated that new IPOs on China's A-stock market be priced by conducting book-building process, where qualified institutional investors are invited to consult on appropriate IPO price. Fei (2009) states, "the notice of trial on book building pricing mechanism for China's IPOs" in 2005 ("The Notice") — a milestone document issued by CSRC officially took effect. The issuing of the notice is aimed to (1) produce more accurate offer price and resolve the high under-pricing problem most IPOs on China's A-stock market will suffer on the first trading day; (2) get more institutional investors involved in pricing process and to elevate their pricing abilities (p.1).

### **Regulatory provision of book building in India**

Referring Securities Exchange Board of India (SEBI) guidelines, Garg (2013) pointed out that the recommendations of Malegam committee, the concept of book building assumed significance in India as SEBI approved, with effect from November 1, 1995, the use of the process in pricing new issues. The option of 100 percent book building was available to only those issuer companies which are to make an issue of capital of and above Rs. 100 crore. Later the issue of ceiling size was reduced to 25 crore. The Companies are bound to adhere to the SEBI's guidelines for book building offers as 75 percent book building and 100 percent book building (p.97). However, Jagannathan et.al. (2010) critically noted that interestingly, in 76 percent of the 309 Indian IPOs during the period January 2000 to December 2010 that used the book building method, the offer prices were set at the maximum of the price range. In 13 percent of the IPOs the offer prices were at the floor, and the rest had the offer prices at the mid point. Indian IPOs therefore resemble a dirty version of a fixed price public offer rather than book building or a uniform price auction (p.4). However, Khurshed, Paleari, Pande and Vismara (2014) states that India has the unique distinction of being the only country that releases information on the IPO book building process live to investors.

Similarly, Securities and Exchange Board of India (SEBI) [Issue of Capital and Disclosure Requirements] Regulations, 2009 includes the following important aspects of the book building requirements: Lead book runner, syndicate members, underwriting, agreement with the stock exchange; appointment of stockbrokers as bidding/collection centers; price not to be disclosed in red herring prospectus; floor price and price band; application-cum-bidding form; anchor investors, margin money, bidding process, determination of price; registering of prospectus with registrar of companies; manner of allotment/ allocation; application for listing; maintenance of books and records and applicability to fast track issues (pp.1-7).

### **Regulatory provision of book building in Pakistan**

Like SEBI, Pakistan's SECP has approved the Book building Regulations, 2015. The book building mechanism in IPO was initially introduced by the SECP in 2008 through amendments to the listing regulations of the stock exchanges. The key features of the regulations are: the total offer size; maximum bid size; registration of book runner with SECP; making bid-size of issuer; publication of prospectus; mechanism for pre-registration of the potential bidders; provision for payment of margin money; restriction on making consolidated bid; the bidding shall

remain open for at least two days; bid shall not make a bid with price variation of more than 20 percent of the prevailing indicative strike price; related-employees not participate in bidding for shares; restriction on release of the subscription money; withdrawal and downward revision of bids shall not be allowed after last day and failure or refusal to comply with or contravention of any of the provision of the regulation shall be punishable with a fine not exceeding ten million rupees (SECP, 2015,pp.1-2).

## **Regulatory provision of book building in Bangladesh**

The provision of book building in Bangladesh Securities and Exchange Commission (BSEC) [Public Issue] Rules, 2015 can briefly be summarised below: first it clarifies the definition of each book building-related word; requirements for filing application for a public offer; submission of application and processing thereof; format and contents of the prospectus and its abridged version; distribution mechanism for issuance of securities; publication of prospectus and opening of subscription list; prospectus delivery requirements; limitation on the use of the prospectus; ordinary shares of the issuer shall be subject to lock-in; issue manager, underwriter, debt securities, fee for public offer and listing of securities; approval, rejection and review, contravention, commission decision shall be final on certain matter; repeal and savings; declaration about the responsibility of the directors, including the CEO of the issuer in respect of the red-herring prospectus/ prospectus/information memorandum; due diligence certificate to be furnished by issue manager(s) in the red-herring prospectus/prospectus/information memorandum; due diligence certificate by the underwriter(s); ratios pertinent to the red-herring prospectus / prospectus/information memorandum as certified by auditors; disclosure requirements in the red-herring prospectus/prospectus/information memorandum and disclosures in abridged version of prospectus; documents to be filed by the issuer (BSEC 2015,pp.1-48) .

## **Pricing mechanism in Nepalese securities market**

In the past, the SEBON generally did not allow companies to float shares in the primary market at price of above Rs. 100 each. **Phuyal (2015) reveals** Nepalese securities market observed two IPOs in the same week one was issued by Barun Hydro Power Company Ltd (BHPC) and the other by Janautthan Samudayic Laghubitta Bikas Bank Ltd (JSBL). BHPC was oversubscribed by nearly 100 times whereas JSBL by 327 times which breaks the highest record. Despite the record breaking oversubscription of IPOs, companies had to pay collection center fees, SEBON registration fees; share certificate printing cost along with the listing cost at Nepal Stock Exchange Ltd. (NEPSE) and CDS and Clearing Limited (CDSC). Hence, the companies were unable to utilise the low cost public savings. Phuyal (2015) further threw light on that many genuine small investors were cheated due to some cunning investors who collect others' citizenship certificates to get more shares in the lottery. And the study also stressed that the funds sourced through Nepali capital market are costlier than those mobilized through other sources. Regarding tightening approvals for IPO applications, China's CSRC targets fake documents, fudged financial and suspect companies that will help boost market trust and improve the quality of new stocks (Xiang, 2017).

In the past some years, only few companies having high net worth were allowed to float at premium to their equity shares. Overviewing the different pricing mechanism in Nepalese securities market, Vaidya (2012) reveals that except for IPO issue at fixed price at par, which has been the norm in Nepalese capital market; few issues have been made under different method, both in the primary issue and secondary market. Closed auction bidding method, with predetermined floor price, was used in case of IPO of Nepal Doorsanchar Company Limited (referred to as NTC) and cross holding share transaction of Standard Chartered Bank Nepal

Limited (SCBNL) held by Nepal Bank Ltd. (p.23). RMDC was the third company — after Chilime Hydro and Nepal Telecom — and the first financial institution to issue primary shares at a premium price. RMDC has been allowed by Securities Board of Nepal and Nepal Rastra Bank (NRB) to issue the shares at a premium rate<sup>2</sup>.

While describing the selling mechanism of right shares, As Bajracharya (2017) pointed out that when companies come up with right shares that go unsubscribed by its shareholders, those unclaimed shares are sold via auction. Similarly, auction is used in the sale of ordinary shares, promoter shares and right shares. Further more, on 29 October, 2017 SEBON directed to all merchant bankers and Application Supported by Blocked Amount (ASBA) members that equal participation of out of Kathmandu valley investors have to be made in auctioning of unsubscribed right shares (SEBON, 2018, p. 156).

Arun Valley Hydropower Development Co. Ltd became the first hydropower company to make IPO at a premium, based on its net worth adding a premium of Rs. 84. Chilime Hydropower Company Limited was the second in making IPO above its par value, i.e., at a premium. Unlikely, open invitation was used for Chilime Hydropower Company as a modality of IPO issue. However, free pricing mechanism is yet to be introduced in Nepali securities market. If either book building or free pricing mechanism is implemented, the companies can fix their IPO's price range, other than the Rs. 100 per share or at a premium which is currently in effect.

Further more, through book building, real sector companies will be attracted toward Nepali securities market and effective transferring of funds will be made from those who have excess funds to those who need funds. It is already mentioned that book building and auction comes under free pricing method in IPOs. The apex regulator seems to be mulling other alternatives such as book building and auction to replacing the fixed pricing mechanism as there are three IPO mechanisms existed in the world: fixed price public offers, book building, and auctions.

## **Regulatory provision and related issues of book building in Nepal**

Nepal does not have a separate book building regulation in IPO mechanisms as yet that have already appeared in many developed and emerging economies around the world including our neighbours. In a newspaper interview answering on premium pricing/ free pricing, Rewat Bahadur Karki, Chairman, Securities Board of Nepal (SEBON) spoke to reporter, “there will not be any regulatory intervention in pricing of IPO and price will be determined based on demand from investors and how much they desire to pay per unit share. Fixed price for IPO was set with a purpose to develop capital market in initial few years of the establishment of secondary market, which continued for long. Recently issued Securities Registration and Issue Regulation has paved the way for open pricing of IOPs. Henceforth, IPO pricing will be determined under book building principle”<sup>3</sup>. However, the amended- regulation would not be completely free pricing. There will be a provision of some cap on the pricing. The amendment in the regulation has come in the wake of the private sector complaining about the current pricing requirement which do not allow company to fix the price of shares on their own<sup>4</sup>.

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<sup>2</sup> “RMDC to launch IPO at premium rate”, *Share Bazar Nepal*, July, 2013, Electronic copy available at: [www.sharebazarnepal.com.np](http://www.sharebazarnepal.com.np), accessed on February 22, 2018.

<sup>3</sup> “NEPSE can reflect real picture of economy only after real sector firms are listed”, *The Himalayan Times*, January 2, 2017, Electronic copy available at: <http://thehimalayantimes.com/business/nepse-can-reflect-real-picture-of-economy-only-after-real-sector-firms-are-listed/>, accessed on January 28, 2018.

<sup>4</sup> “Free pricing method for IPO in the offering”, *My Republica*, July 26, 2016, Electronic copy available at: [www.myrepublica.com/category/22](http://www.myrepublica.com/category/22), accessed on February 26, 2018.

The amended Securities Registration and Issue Regulations 2016 indicates that SEBON—the apex regulator of Nepalese securities market seems to adopt the modalities of free pricing as allowing companies to float equity shares four times higher than their net worth. SEBON already includes a provision to make IPO at a premium and auction bidding method. It also reveals that when the market becomes fully matured, then the apex regulator will probably be ready to implement the full-fledged free pricing mechanism. In an interview, SEBON, Chairman spoke to *New business age* that companies can be encouraged to enter the market if they are allowed free pricing in primary issues. Nevertheless, considering the present scenario of the Nepali stock market, we can implement other IPO models rather than the 100 percent free pricing. We can practice a system where companies can float shares at a price higher than their net worth. The goodwill of the big companies needs to be recognized- which they have earned over the years. Though the automation has been developing gradually, our stock market has not yet become mature enough<sup>5</sup>.

Emphasising the book building method of IPO, **Niranjan Phuyal** Acting Deputy Manager, NEPSE, spoke to *New business age*, “the IPO on par value of shares is a very old system which almost all stock markets across the world stopped practicing many decades ago. As the Nepalese stock market is yet to develop, there are better alternatives like the book building process which is being practiced in India and many other emerging markets”<sup>6</sup>. Moreover, **Anuj K. Agrawal**, Vice-President, Confederation of Nepalese Industries (CNI) expressed views on Nepalese real sector and the IPOs, “allowing companies to issue shares at ‘premium’ or ‘fair value’ will resolve one of the major barriers for real sector companies to become listed. This can be done via the book building process or direct issuance of shares at a minimum floor price”<sup>7</sup>.

Meanwhile, SEBON has issued Securities Registration and Issue Regulations, 2016 and the main features relating to IPOs of the regulations are: provision of premium pricing on public issue; and real sector corporate body can set aside up to 10 percent of its issued capital for the people residing in the area affected by the industry or project [affected area means the area mentioned in the environmental impact assessment (EIA) report]. This makes those companies recording profit in three consecutive years can issue their IPO at a premium price. Moreover, Securities Issue and Allotment Guidelines 2017 has issued by the SEBON and key features of the guidelines relating to IPOs/FPOs are: set criteria for fixing premium price of shares of corporate body that want to float shares at a premium; companies will be allowed to float their next FPO only five years after their earlier FPOs; with the implementation of ASBA, primary market has been expanded in all 75 districts; provision of allocating minimum 10 shares to all applicants; natural person can only be allowed to apply for IPOs; and allotment of IPOs has to be shortened to 20 days from 45-70 days (SEBON, 2017, p.10-11).

SEBON’s current policy and programme (2074 B.S.) reveals that the regulator has been considering alternatives like book building and auction to replacing the fixed pricing system when market becomes mature. Till then, the regulator seems to be adopting free pricing with some cap which will pave the way for IPO alternatives such as, book building and auction. However, book building and auction comes under free pricing method in IPOs. Through Securities Registration and Issue Regulations, 2016 and Securities Issue and Approval Guidelines, 2017, the apex regulator has made two important improvements particularly in the IPO mechanisms of Nepal. (i) Specified standard calculating method of premium: Regarding calculation of premium. The

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<sup>5</sup> “The real sector’s real stock market deal”, *New Business Age*, July 29, 2016, Electronic copy available at: <http://www.newbusinessage.com/MagazineArticles/index/963>, accessed on February 22, 2018.

<sup>6</sup> *Ibid.*

<sup>7</sup> *Ibid.*

guidelines further states, “though public companies, who are in profit for last three consecutive years, can also issue their shares at a premium rate, there are certain conditions like premium within the limit of net worth per share derived from latest audit which do not account of a company’s future growth scope which make it difficult for company to list their shares in the secondary market for the trading”<sup>8</sup>. Additionally, future discounted cash flow and international practices have to be employed while calculating average price on the basis of total value. (ii) natural person can only be allowed to apply for the IPOs. If these provisions are properly implemented, then the market would be more transparent and many genuine investors will be benefited.

Like economic theories, models, plans, programme, legal provisions and so on and their effective implementation and enforcement is essential for pricing mechanisms in IPOs. Mahathir in 2000 explained, “Malaysia is interested in results not system. No matter how good a system is, if it delivers a bad result we are not going to stick to it” (S.No.25). In Nepalese context, we must learn which pricing mechanism in IPOs produces a good result and not to be too fanatical about IPO mechanisms. At the same time, Nepalese ground reality and uniqueness should also be maintained while introducing new pricing mechanism. We should not be fanatically loyal towards developed world that have been following their own practices would produce good results in developing world. However, Nepalese securities market may not be separated out from the global markets and it may follow appropriate IPO mechanisms that have been practicing across the world as we have been in a world system of globalisation ---that is a world without borders or seamless world. But at the same time, pros and cons of IPO mechanisms should be evaluated and important prerequisite conditions should also be followed before replacing new IPO mechanisms. Otherwise, introduction of new IPO mechanisms would surely be like Nepali political leaders making “New Nepal” slogan.

## **Pros and cons of book building approach**

Gurus of book building method argue that in book-building approach, there is discriminatory share allocations; the pooling of IPOs and other standard book-building practices price new shares more accurately, thus enabling the issuer to maximise proceeds received from the IPO, and minimise fluctuations in share price immediately after the IPOs (Krushnakumaar, p.3). In recent years, book-building approach has emerged as a method of choice among investment banks in the U.S and across the globe for IPO offerings. Ellis (2008) states, “globally, the book building method is favoured for its mutually beneficial nature: investors get the shares at a fair price that typically has potential upside, and the issuing company receives fair compensation. In book building, the issuer sets a price range within which the investor is allowed to bid for shares. The range is based on where comparable companies are trading and an estimate of the value of the company that the market will bear. The investors then, bid to purchase an agreed number of shares for a price which they feel reflects fair value”.

Through price discovery, it is said that fair price will be discovered in book building mechanism. Moreover, Gondal (2017) describes that book building mechanism usually results in additional aggressive pricing as compared to the traditional fixed price mechanism due to its inherent factor of price discovery by well-informed institutional and high net worth investors. Further more, (Jagannathan et.al. 2010) states that if, as we conjecture the reason for book building’s dominance is that it is a “direct” mechanism, then the popularity of fixed price public offers in less active markets is to be expected. As we shall see, implementing a mechanism such as

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<sup>8</sup> My Republica, Op. cit.,No.4.

book building requires an established, trusted and sophisticated underwriter, communicating with investors who have sufficient capacity to collect and process information. (p.6)

Referring cons of book building mechanism, Rashid (2013) reveals, "for the time being, if it is assumed that book-building method is OK, then problem lies with how it is being misused. Before digging dip into the determination of price under the book building method, it should be recalled as to what the fair price of a security is? The fair value of a stock is the present value of future cash flows to be generated in the foreseeable period considering a risk adjusted discount rate" (p.177). Similarly, in book building method, sometimes Price Earning Ratio (PE) is used in determining the price. Rashid (2013) also pointed out that when issuer company arranges road show with inflated price (at that time, the market P/E was over 25 times in Bangladesh) to invite offer for indicative price from the institutional investors, it has been observed that institutional investors usually agree to give very high price - or even higher one than proposed by the company. Moreover, it is blamed that manipulators benefiting from book building method. Further more, it is said that in book building method, many companies are fixing very high price of their shares before off loading in the securities market. As a result, huge amount of money is being drawn off from the stock market, and liquidity crisis has been emerged<sup>9</sup>. .

### **Fixed pricing versus book building in IPO mechanisms**

From the perspective of small investors sometimes fixed price approach of IPO will be profitable to book building method. In the fixed price method, the company values the prices of the shares at a pre-determined price. It indicates that the price of the company's shares at IPO is often lower than a "fair" market value and that resulted price rises dramatically in the first day of secondary market trading after the IPO. On this regard, Azzam (2008) states, "the effect of fixed price pricing of IPOs has been to benefit retail investors disproportionately. But it has become evident that the fixed price method of the IPO is likely to discourage from going public those responsible companies that aspire to command a fair value. Book building means the flotation price is much closer to the market fair value at the time of the IPO and a doubling or tripling of the price when trading starts in the secondary market should thereby become less likely and bubbles may be avoided"<sup>10</sup>. It showed that there is a greater possibility of speculative profit in fixed pricing method whereas there is a lesser possibility in the IPO of book building method. Securities market regulators major concern is to promote investing rather than speculation.

### **Small and medium-sized investors' protection: An IPO perspective**

Investor protection especially small and medium-sized investors have always become a crucial point that whatever system or mechanism followed by the regulators. Promoting the IPO system reform, China's CSRC spokesperson answered questions from reporters regarding investor protection one of the key matters of the reform. The purpose of this round of reform is to protect the lawful rights and interests of investors and especially small and medium-sized investors. According to CSRC spokesperson, investor protection had five aspects, "first, to urge issuers to use plain language and provide truthful, accurate and complete company information, enhance risk disclosure and enable investors to make informed investment decisions. Second, to promote fair and reasonable pricing, restrict high pricing by issuers, prevent investors from quoting high prices, and curb speculation of new stocks ; third, to respect the subscription intent of small and medium-sized investors in the allocation of new shares and adjust the claw-back mechanism and the online

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<sup>9</sup>The Financial Express, op. cit., no.1.

<sup>10</sup> "Book building is the way forward for IPOs", Financial Times, June 25, 2008, Electronic copy available at: [www.ft.com/markets](http://www.ft.com/markets), accessed on February 27, 2018.

placement mechanism; fourth, where violations in relation to information disclosure have caused losses to investors, issuers and their controlling shareholders, relevant intermediary agencies and other responsible parties must compensate for the losses of investors in accordance with the law; and fifth or last, to enhance regulatory enforcement”<sup>11</sup>.

In Indian context, Kamath (2012) reveals, “SEBI has taken a host of steps to protect the retail investors. First, every retail applicant in an IPO, will get a certain number of shares, subject to availability while the remaining will be allotted proportionally. It’s a positive for retail investors as there will be assured allotment. It is likely to encourage participation from investors who stay away from IPO thinking they won’t get any share. While this will benefit investors who do not apply for shares worth the maximum amount permissible, those who apply for the full amount are likely to get fewer shares”. It indicates SEBI has a clear provision of small investors’ protection.

In Nepalese context, recently issued Securities Issue and Allotment Guidelines, 2017 by SEBON has a clear provision of allocating minimum 10 shares to all applicants. This initiation by SEBON marked an important milestone towards small investors’ protection as there will be fixed allotment in the IPOs for them. Similarly, Securities Registration and Issue Regulations, 2016 has a provision of real sector corporate body can set aside up to 10 percent of its issued capital for the people residing in the area affected by the industry or project. However, for wider participation and making Nepalese securities market more inclusive (particularly in IPOs and also in secondary market), people across the country should invest in the securities market, not just those from Kathmandu and major cities of Nepal. If no balanced development, rural low-income people will not be benefited from the Gross Domestic Product (GDP), and small and medium-sized investors will not be protected by the securities market regulators of Nepal, then the “New Nepal” would only be a heaven for the ruling elites, political leaders, handful player of the financial market, sole beneficiaries of aid agency, influential bureaucrats and other recipients of Nepalese economic liberalisation. In such a state of affairs, present day rural back water people and small & medium-sized investors finding themselves bewildered with the slogan of Marxian socialism diluted with neo-liberal economy or democratic socialism diluted with market economy. If imbalanced distribution of wealth remains continued, then another version of USA’s Occupy Wall Street movement might be appeared towards greater income equality in Nepal. Hence, Social justice and equality could not have been possible without the practice of the Welfare State system in the so called *Loktantra*.

However, as previously mentioned that SEBON has recently made two important provisions in the securities market towards equality and social justice, one for privileges to small investors in IPOs and another is for the people residing in the area affected by the industry or project. In this way, small and medium sized investors should be protected by the apex regulator of the securities market along with the institutional investors in the days to come. Like small and medium-sized investors, institutional investors are equally important for the development and maintaining efficiency in the securities market. Without presence of institutional investors, the development of securities market could not have been possible and the market remains murky.

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<sup>11</sup> “Q&A by CSRC Spokesperson on the Opinions on Further Promoting the IPO System Reform”, November 30, 2013, Electronic copy available at: [www.csrc.gov.cn/pub/csrc\\_en/newsfacts/PressConference/](http://www.csrc.gov.cn/pub/csrc_en/newsfacts/PressConference/), accessed on February 29, 2018.

## Conclusions

This paper describes the book building mechanism around the world in light of the regulatory framework and identifies the prospect of the mechanism in Nepalese context. Fixed price public offers, book building, and auctions come under IPO mechanisms. Book building and auction come under free pricing method in IPOs. Amongst IPO mechanisms, book-building has become as a method of choice in the United States of America (USA) and around the world including our neighboring countries: China, India, Pakistan and Bangladesh. However, in India, book building pricing mechanism was first allowed; it became popular; it was banned after some years of practice; and then eventually resumed the mechanism.

In Bangladesh, some years of practice, government had decided to postpone temporarily book building method for price fixing of shares; the mechanism was resumed shortly. Likewise, in Pakistan book building was started as another mode of offering shares to investors and in 2017, Inbox Business Technologies--- a firm, however, postponed the book-building process in Pakistan keeping in view political uncertainty. Despite Inbox, Pakistan has been doing better in book building method of IPOs. In some North American and European counties, auction was abandoned and they started to adopt book building. Additionally, IPO auctions were tried in Malaysia, Singapore, Taiwan in the 1990s, but they were left in all of these countries before book building became popular

In Nepalese context, SEBON likely to be considering other alternatives like book building and auction to replacing the fixed pricing system when market becomes mature. Till then, the regulator seems to adopt free pricing with some cap which will pave the way for free pricing method in IPOs. IPO practices around the world reveal that each issue mechanism has advantages and neither clearly dominates; only the market can tell whether there is a place for both or only one of them. It is suggested that SEBON should introduce book building mechanism after maintaining informational and other efficiencies in the securities market of Nepal. Among other factors, transparency is an essential prerequisite for book building as one the IPO mechanisms. Moreover, book building is one of the widely used pricing mechanisms around the world including our Asian neighbours. At the same time, we must learn that which pricing mechanism in IPOs produces a good result in Nepalese context and not to be too fanatical about IPO mechanisms. SEBON should think about hybrid book building/auctions as some counties in the world have been adopting. As being a World Trade Organisation (WTO) member, however, Nepal cannot be remained an exceptional market in such a globalised world. It is already mentioned that book building has emerged as one of the widely used pricing mechanisms and selling IPOs around the world including our Asian neighbours

Recently issued Securities Issue and Allotment Guidelines, 2017 by SEBON, has marked an important milestone towards protection of small investors. Likewise, Securities Registration and Issue Regulations, 2016 has also a well-known provision of real sector corporate body can set aside up to 10 percent of its issued capital for the people residing in the area affected by the industry or project. Any regulators' policy should be guided towards maintaining the system of the Welfare State not syndicated corny capitalism. It is hoped that Nepalese securities market regulator should focus on regional balanced development while introducing new policy and programme. The regulators policy and programme should also be guided to reduce income disparity by protecting small and medium-sized investors across Nepal as CSRC in China and SEBI in India have been actively practicing such initiatives in our neighborhoods.

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# **Effect of macroeconomic variables on stock market index: With reference to Nepal Stock Exchange**

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## **Abstract**

*This study has examined the effect of macroeconomic variables on the NEPSE index over the period of January 2002 to December 2016. The study adopted correlation and causal comparative research design to evaluate the effect of macroeconomic variables on the NEPSE index. The test of stationarity showed that all the variables are not stationary at their level except the variable interest rate ( $\ln INT$ ) and they became stationary at their  $\Delta \ln S_t$  difference. Thus all the variables except interest rate ( $\ln INT$ ) are used at their  $\Delta \ln S_t$  difference for further analysis. Pearson's correlation model was used to observe the relationship between NEPSE index and macroeconomic variables. Furthermore, Regressions model was used to analyse the effect of macroeconomic variables on the NEPSE index. The regression analysis showed that the coefficient of exchange rate ( $\Delta \ln ER$ ) and gold price ( $\Delta \ln GP$ ) is statistically insignificant at 5 percent level of significance whereas the coefficient of interest rate ( $\ln INT$ ) is statistically significant 5 percent level of significant. Similarly, the coefficient of wholesale price index ( $\Delta \ln WPI$ ) is statistically significant at 1 percent level of significance. Thus, this study concludes that the interest rate ( $\ln INT$ ) and wholesale price index ( $\Delta \ln WPI$ ) has more explanatory power than exchange rate ( $\Delta \ln ER$ ) and gold price ( $\Delta \ln GP$ ) for explaining variation in stock market index and they has greater effect on stock market index than exchange rate and gold price in Nepalese stock market.*

**Keywords:** Macroeconomic variables, Exchange rate, Interest rate, Gold price, Wholesale price index and stock market index

## **1. Introduction**

Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT), two notable theories have been emerged to explain the stock return. CAPM was based on the work of Markowitz (1952) mean value model. The concept of CAPM was further developed by Sharpe (1964), Lintner (1965) and Mossin (1966). According to CAPM the expected return on an asset above the risk-free rate is linearly related to the non-diversifiable risk as measured by the asset's beta ( $\beta$ ). Since, CAPM is based on single factor beta ( $\beta$ ) its predictability for explaining stock return has been criticised in recent years. and multifactor model Arbitrage Pricing Theory (APT) was developed by Ross (1976). APT assumes that stock returns are based upon several economic factors. which include market return as well as other factors., and can be grouped into industry wide and macroeconomic forces.

The relationship between macroeconomic variables and stock return has been extensively studied in developed capital market (e.g., Chen *et. al.*, 1986; Fama and French, 1988, Mayasmi and Koh, 2000; Joseph, 2012) over the last few decades. In the context emerging capital market, Izedonmi and Abdullahi, 2011; Rostamy, Hosseini, Bakhshitanlou, 2013; Hussinet. *al.*, 2013; Geete, 2016 have conducted the study. The studies conducted on developed as well as emerging capital market confirmed that some macroeconomic variables such as interest rate, GDP, industrial production,

money supply, gold price, exchange rate and inflation rate, etc. plays significant role for explaining stock return.

The impact of macroeconomic variables in Lahore Stock Exchange has been analysed by Sohail and Hussain (2009). Sohail and Hussain used consumer price index, industrial production index, real effective exchange rate, money supply and treasury bills rate as proxy of macroeconomic variables. Using the monthly data from December 2002 to June 2008 the study of Sohail and Hussain concluded that there was a negative impact of consumer price index on stock returns, while, industrial production index, real effective exchange rate, money supply had a significant positive effect on the stock returns in the long-run.

Izedonmi and Abdullahi (2011) conducted a study on the effects of macroeconomic factors. on the Nigerian stock returns. To analyse the effect of macroeconomic variables on stock return they used inflation, exchange rate and market capitalisation as macroeconomic variables for the period 2000 to 2004. Using the Ordinary Least Square (OLS) the study of Izedonmi and Abdullahi found the probability value for market capitalisation 0.12, for the exchange rate 0.16 and for the inflation 0.29. All the probability values are greater than 0.05 which implies that they do not have significant influence on the firms in different sectors. They, therefore, concluded that macroeconomic factor have no significant influence in the Nigerian stock exchange market.

To observe the relationship between macroeconomic variables and stock market returns in Ghana Kuwornu (2011) conducted a study. The study of Kuwornu used monthly data over the period of January 1992 to December, 2008 and used consumer price index (as a proxy for inflation), crude oil price, exchange rate and 91 day treasury bill rate (as a proxy for interest rate) as proxy of Macroeconomic variables. Kuwornu used Full Information Maximum Likelihood Estimation procedure in establishing the relationship between macroeconomic variables and stock market returns.

The empirical results of the study revealed that there exist a significant relationship between stock market returns and three macroeconomic variables; consumer price index (inflation rate), exchange rate and treasury bill rate. The study further concluded that Consumer price index (Inflation rate) had a positive significant effect, while exchange rate and treasury bill rate had negative significant influence on stock market returns. Similarly, the study of Kuwornu further concluded that the crude oil prices do not have any significant effect on stock returns.

Joseph (2012) studied the effect of foreign exchange and interest rate changes on UK firms in the chemical, electrical, engineering and pharmaceutical industries for the period of 1988 to 2000. The study of Joseph employed two different measures of foreign exchange rate, along with a measure of interest rate changes. The results revealed that industry returns were more negatively affected by interest rate changes than by foreign exchange rate changes. The negative effects of interest rate changes and foreign exchange rate changes appeared more evident for the electrical and engineering sectors. whereas these effects were positive for the pharmaceutical industry. Additionally, the results at the portfolio-level were generally similar with those based on the firm-level analysis, except that the short term foreign exchange rate impact was very weak at the portfolio level. Overall, the results at the individual firm level implied that the impact of foreign exchange rate and interest rate changes had adverse effects on stock returns.

Similarly, Rostamy, Hosseini, Bakhshitanlou (2013) has examined the impact of market return, oil price, and exchange rate and interest rate changes on stock returns in Tehran Stock Exchange (TSE). They used monthly data during the period of November 22, 2003 to November 20, 2008. Using the multivariate regression model and autoregressive distributed lag (ARDL) model they

concluded that market return, oil price, exchange rate and interest rate changes have significant impact on some industries returns.

Hussinet. *al.* (2013) has analysed the effect of oil and gold prices on Islamic stock market in Malaysia for the period of January 2007 to December 2011. The study of Hussin used the co-integration analysis, Granger causality test, Impulse Response Function (IRF) and Variance Decomposition (VDC) analysis. The study concluded that oil price variables affect the Islamic stock return in the short run in Malaysia whereas the Gold Price is not a valid variable for the purpose of predicting changes in Islamic share prices. On the other hand Bilalet. *al.* (2013) examine the long-run relationship between gold prices and Karachi Stock Exchange (KSE) and Bombay Stock Exchange (BSE). They used the monthly data for the period of 1<sup>st</sup> July 2005 to 30<sup>th</sup> June 2011. The study of Bilal used Unit Root Augmented Dickey Fuller test, Phillips-Perron, Johnson Co-integration and Granger's Causality tests to measure the long-run relationship between gold prices, KSE and BSE. From the co-integration test they concluded that there exist no long-run relationship between monthly average gold prices and KSE stock index; whereas, a significant long-run relationship exists between BSE stock index and average gold prices. Similarly, the result of Granger causality test demonstrated that there exist no causal relationship among average gold prices, KSE and BSE stock indices.

Furthermore, Samontaray, Nugali, and Sasidhar (2014) conducted a study on the effect of macroeconomic variable on stock return on Saudi perspective. They used Saudi index (TASI) as dependent variable and three independent variables; the Oil WTI, Saudi Exports and the PE Ratio. Using the monthly data from 2003 to 2013, they concluded that TASI is positively correlated with the three economic variables considered, Oil WTI, Saudi exports and price earnings ratio. They further confirmed that the three independent variables significant importance in predicting the TASI and these three variables explain about 93 percent of variation in TASI. To analyse the role of macroeconomic variables in the stock market in Iran Khodaparasti (2014) conducted a study. Khodaparasti has analysed the impact of inflation, exchange, volume of liquidity in the private sector and index of industrial production on stock market of Iran. The study of Khodaparasti concluded that the exchange rate and industrial index have more effect on the stock market than inflation and M1.

Similarly, Venkatraja (2014) investigated the relationship between the Indian stock market performance (BSE Sensex) and five macroeconomic variables. Venkatraja used index of industrial production, wholesale price index, gold price, foreign institutional investment and real effective exchange rate over the of period April 2010- June 2014. The study of Venkatraja concluded that 82 percent of variation in Sensex is explained by these five selected macroeconomic factors. Furthermore, the study concluded that the coefficients of all the variables except index of industrial production are statistically significant thus, inflation, inflow of foreign institutional investment, exchange rate and gold price has significant impact the Indian stock market performance.

Furthermore, to observe the impact of macroeconomic variables on stock markets of emerging markets Barakat, Elgazzar, and Hanafy (2016) conducted a study. They analysed the data of two emerging markets Egypt and Tunisia for the period from January 1998 to January 2014. They concluded that all the macroeconomic variables used in the study (interest rate, exchange rate, CPI and money supply) have a relationship with the stock market either a long run relationship or a causal relation in both Egypt and Tunisia. Thus, there is a relationship between stock market and these macroeconomic factors. and that the macroeconomic factors. play a great role in the stock market fluctuations and can be used to explain them. Moreover, Geete (2016) analysed the effect of gold prices and dollar prices on the stock exchange indices of Sensex Nifty. Geete used secondary data

for 3 years. from 2011 to 2014. Using multiple regression analysis Geete concluded that both dollar and gold prices have positive effect on the stock market indices.

All the above mentioned studies have been carried in developed and emerging capital markets to observe the impact of macroeconomic variable on stock return and no unanimous conclusions are drawn. The findings of all these studies suggest that there exists significant relationship between macroeconomic variable and stock return. In the context of Nepal more studies have not been conducted to evaluate the explanatory power of macroeconomic variable for stock return. Thus, this study aims to evaluate the impact of macroeconomic variable on NEPSE index. In developed and emerging capital markets the impact of different macroeconomic variable on stock market have been analysed such as Izedonmi and Abdullahi (2011) used inflation and exchange rate; Rostamy, Hosseini, Bakhshitanlou (2013) used oil price, exchange rate and interest rate; Hussinet. al. (2013) used oil and gold prices; Samontaray, Nugali, and Sasidhar (2014) used Oil WTI, Exports and the PE Ratio; Khodaparasti (2014) used inflation, exchange, volume of liquidity in the private sector; and Geete (2016) used gold prices and dollar prices. In this study exchange rate, interest rate and gold price has been used as proxy of macroeconomic variables. The variables under investigation are 91days treasury bill interest rate as proxy for interest rate, local currency NPR per US dollar as proxy for exchange rate, Gold price in NPR per troy ounce as proxy of gold price and, and finally market index as proxy for the stock market. Other macroeconomic variables such as inflation, GDP, industrial production, oil price, etc. have not been used due to unavailability of data. Furthermore, other firm specific variable such as size, equity market capitalisation, earning yield, cash flow yield, and dividend yield, etc. which also affects the stock return are not incorporated in this study.

This paper empirically evaluates the impact of macroeconomic variable on the NEPSE index. It is an empirical question whether macroeconomic variable explains stock market or not in the context of Nepal. The rest of the paper is organised as follows: Objective of the study is presented in *Section 2*. *Section 3* looks briefly research methodology used in this study. The descriptive statistics are presented in *Section 4*. The empirical analysis is discussed in *Section 5* and summary and conclusion is presented in *Section 6*.

## **2. Objectives of the Study**

The basic objective of this study is to determine the effect of macroeconomic variables on stock market index of Nepal. The other specific objectives are as follows:

- Observe the relationship between macroeconomic variables and stock market index.
- Observe the effect of exchange rate on stock market index of Nepal.
- Analyse the effect of interest rate on stock market index of Nepal.
- Evaluate the effect of gold price on stock market index of Nepal.
- Evaluate the effect of wholesale price index on stock market index of Nepal.

### **3. Research design and data**

#### **3.1 Research design**

According to Cooper and Schindler (2006) research design is the plan and structure of investigation so conceived as to obtain answer to research questions. This study employed descriptive, correlation and causal comparative research design.

This study follows descriptive research design, which is generally used to describe the situation and event occurring at present. It is a process of accumulating facts. This study attempts to describe the effect of macroeconomic variables on stock index of Nepal. Thus, this study follows descriptive research design to describe the effect of macroeconomic variable on the stock index. In this study an attempt has been made to establish the magnitude and direction of relationship between stock index and macroeconomic variables such as exchange rate, interest rate and gold price thus this study has also adopted correlation research design, which is basically concerned with assessing relationships among variables. Furthermore, this study has also adopted causal comparative research design to analyse the effect of macroeconomic variables on stock index of Nepal.

#### **3.2 Nature and sources of data**

This study is based on secondary data. The required data for this study is collected from various sources. The data for stock index is collected from Nepal Stock Exchange. For this purpose the official web site of Nepal Stock exchange is used. Similarly, the necessary data of macroeconomic variables exchange rate, interest rates and wholesale price index is obtained from the quarterly economic bulletin published by Nepal Rastra Bank. For exchange rate local currency NPR per US dollar is used and for interest rate the annual interest rate of 91-days Treasury bill is used. Furthermore, the data for another macroeconomic variable used in this study gold price was collected from the web site of index mundi. The gold price in NPR per Troy ounce is used.

This study used monthly data from January 2002 to December 2016, which produce 180 observations, to analyse the impact of macroeconomic variable on stock index.

#### **3.3 Data analysis techniques**

The collected data are analysed using the E-views 9.5. The output of E-views provided descriptive statistics, correlation coefficient, unit root statistics and regression equation. The correlation analysis was used to observe the relationship between stock market index value and macroeconomic variables and the regression analysis was used to analyse the impact of macroeconomic variables (independent variables) on the stock market index (dependent variable). Augmented Dickey-Fuller test and Phillips-Perron test has been used to test the stationarity of the time series data. Multivariate regression analysis was performed using the following regression model specified in 3.4.

#### **3.4 Model specification**

This study has used Multivariate Regression Analysis computed by standard OLS formula to investigate the impact of the independent variables (macroeconomic variables namely exchange rate, gold price, interest rate and wholesale price index) against the dependent variable (Stock index). At the beginning all the variables has been transferred into log form and then the existence of unit root has been tested using Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test. The unit root test showed the existence of unit root in all variables except interest rate in level data series thus first difference has been taken to remove unit root of these variables.

Thus, the multivariate regression model is developed by the following specification:

$$DLn(NEPSE)_t = \beta_0 + \beta_1 DLnER_t + \beta_2 DLnGP_t + \beta_3 LnINT_t + \beta_4 DLnWPI_t + \varepsilon_t$$

Where:

$DLn(NEPSE)_t$  = the first difference of the log of the Nepal Stock Index (NEPSE) value for time  $t$ ,

$\beta_i; i = 1, 2, 3, 4$  = the coefficients for the various independent variables,

$DLnER_t$  = the first difference of the log of exchange rate of NPR per USD for time  $t$ ,

$DLnGP_t$  = The first difference of the log of gold price NPR per troy ounce for time  $t$ ,

$LnINT_t$  = the log of interest rate of 91-days Treasury bill for time  $t$ ,

$DLnWPI_t$  = the first difference of the log of Wholesale price index, and

$\varepsilon_t$  = the residual error term.

#### 4. Descriptive statistics

Table 1 shows the descriptive statistics of macroeconomic variables used in the study. The mean value of NEPSE Index is 582.9005 with the median value of 483.065. The minimum value and maximum value of NEPSE Index is 196.34 and 1,862.76 respectively which shows the high variation in stock index. The mean and median value of Interest rate is 3.0012 percent and 2.6987 respectively. Similarly, the mean value of Exchange rate NPR per US is Rs. 81.80 with the median value of Rs. 77.12. The maximum value and minimum value of Exchange rate is Rs. 63.70 and Rs. 110. 16. Furthermore, the mean value of Gold price per troy ounce is Rs. 79,781.01 with the median value of Rs. 73,805.65. The minimum and maximum value of gold price is Rs. 21,584.78 and Rs. 152,397.10 respectively which shows the high variation in gold price during the study period. Similarly, the mean and median value of wholesale price index is 199.9319 and 197.30 respectively with the minimum and maximum value 102.20 and 335.30 respectively. Furthermore, Jarque-Bera test statistics is used for testing whether the data series is normally distributed. The small the probability value of Jarque-Bera failed to accept the normal distribution of data.

**Table 1: Descriptive statistics**

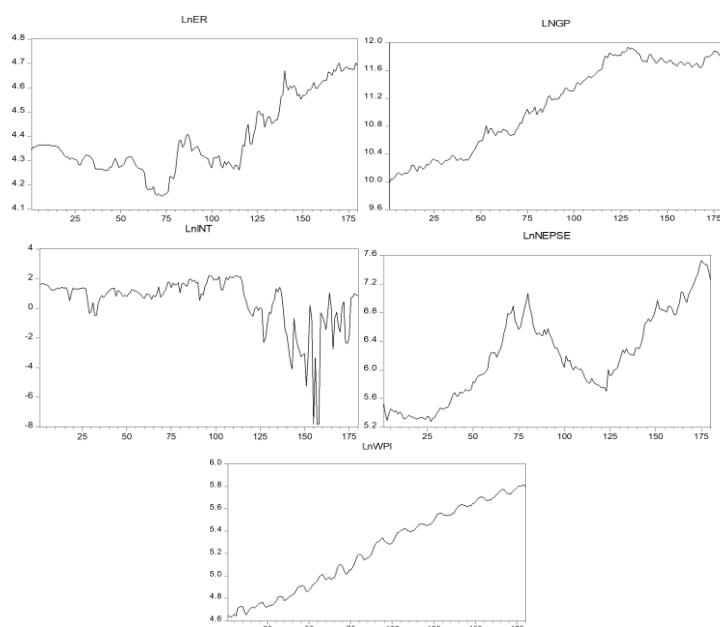
The table exhibits descriptive statistics (mean, median, standard deviation, minimum, maximum values, skewness, kurtosis and Jarque-Bera) of the variable being studied for the period of January 2002 to December 2016. NEPSE Index is the monthly index value of Nepal Stock Exchange. Interest rate is the annual interest rate of 91-days Treasury bill. Exchange rate is the exchange rate of Local currency NPR per US dollar Gold price is the gold price in NPR per troy ounce, and WPI is the wholesale price index.

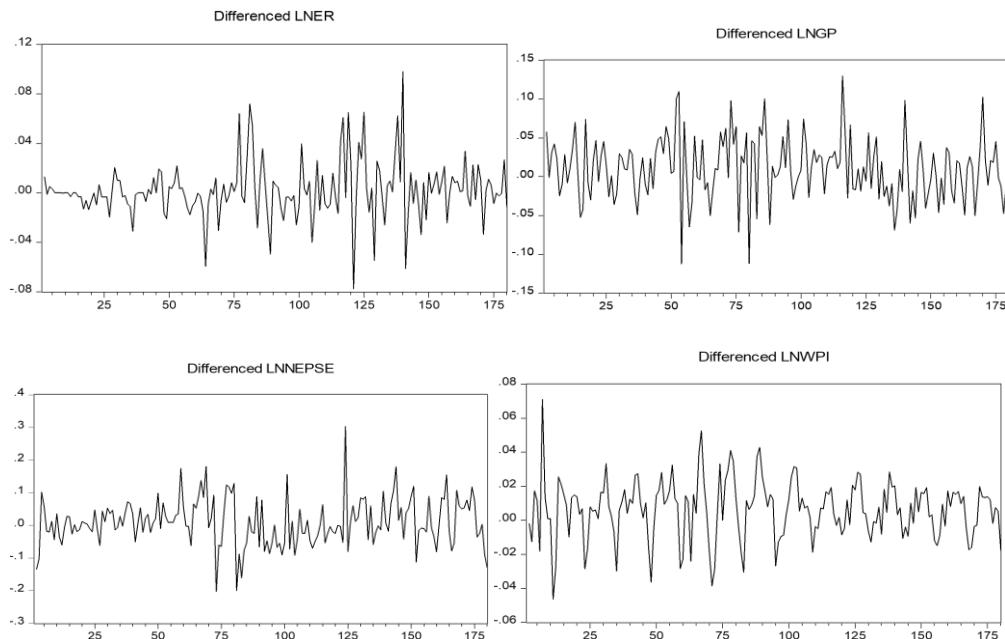
Variables	NEPSE Index	Interest Rate (%)	Exchange Rate (Rs.)	Gold Price (Rs.)	Wholesale Price index
Mean	582.9005	3.0012	81.8000	79781.01	199.9319
Median	483.0650	2.6987	77.1200	73805.65	197.3000
Maximum	1862.7600	9.1139	110.1600	152397.10	335.3000
Minimum	196.3400	0.0004	63.70000	21584.78	102.20000
Std.Dev.	376.2407	2.3806	12.9738	43595.86	72.3879
Skewness	1.3312	0.7541	0.8247	0.1239	0.2863
Kurtosis	4.4870	2.9235	2.3931	1.4159	1.7126
Jarque-Bera	69.7469	17.1035	23.1679	19.28004	14.8891
Probability	0.0000	0.0001	0.0000	0.0000	0.0005
Observations	180	180	180	180	180

## 5. Test for stationarity

Visual plot of the variable is the first step of the analysis of time series data. Figure 1 and 2 presents the monthly observations of all variables in their log form and in 1<sup>st</sup> order difference respectively. In all graphs time is presented in x-axis and values of the respective variable are presented in y-axis. It is evident from the graph presented in figure 1 all the variables except LnINT are not-stationary. It indicates that their respective means and variance are not constant. The graph of LnER, LnGP and LnWPI showed fluctuating increasing trend. Whereas the graph of LnINT showed not much more fluctuating trend. Similarly, the graph of LnNEPSE is more up and downward trend during the entire study period.

**Figure 1: Monthly observations of all variables at their level**  
**Figure 1 Monthly observation of all variables in log form**



**Figure 2: Monthly observations of all variables in 1<sup>st</sup> order difference**

As shown in figure 2 when the  $\text{fiRs.t}$  order difference of all the variables except  $\text{LnINT}$  is taken, the variables have no trending behaviour: this suggest that the variables are stationary at the  $\text{fiRs.t}$  order difference. The test of stationarity and unit root is extremely important in time series analysis. If the concept of stationarity and unit root are ignored in time series data spurious regression problem will occur. From the graphical analysis presented in figure 1 and 2 it is confirmed that the time series data expect  $\text{LnINT}$  are not stationary in their log level but they become stationary when they are differenced at their 1<sup>st</sup> level. To confirm the stationarity of data further this study conducted widely used Augmented Dickey-Fuller test and Philip-Perron test using E-views 9.5 programme. Table 2 shows the result of unit root test of all variables at their level and in 1<sup>st</sup> order difference. As depicted in Table 2 the p-values of the variable  $\text{LnNEPSE}$ ,  $\text{LnER}$ ,  $\text{LnGP}$ , and  $\text{LnWPI}$  is more than 5 percent we failed to reject the null hypothesis of unit root at their level. Since the P-values of all these variables are less than 5 percent in both Augmented Dickey-Fuller test and Phillips-Perron test thus, they reject the null hypothesis of unit root at their 1<sup>st</sup> difference. The variable  $\text{LnINT}$  failed to accept null hypothesis of unit root at their level because its p-value is less than 5 percent.

**Table 2: Unit root test at level and 1<sup>st</sup>difference**

Variables	Test of unit root in	Augmented Dickey-Fuller Test		Phillips-Perron Test	
		ADF t-stat	p-value	PP t-stat	p-value
LnNEPSE	Level Data	-0.660453	0.8525	-0.277146	0.9245
	1 <sup>st</sup> Difference Data	-10.96815	0.0000	-10.98282	0.0000
LnER	Level Data	-0.050236	0.9518	-0.166754	0.9390
	1 <sup>st</sup> Difference Data	-12.06407	0.0000	-12.05638	0.0000
LnGP	Level Data	-1.698071	0.4305	-1.698661	0.4302
	1 <sup>st</sup> Difference Data	-12.49252	0.0000	-12.46899	0.0000
LnINT	Level Data	-2.880912	0.0496	-4.262576	0.0007
LnWPI	Level Data	-0.804734	0.8149	-0.435364	0.8992
	1 <sup>st</sup> Difference Data	-3.853367	0.0030	-7.552468	0.0000

## 6. Empirical analysis

### 6.1 Correlation analysis

The correlation coefficients are calculated for the period of January 2002 to December 2016 on Nepal stock index value (LnNEPSE), Exchange rate (LnER), Gold price (LnGP), Interest rate (LnINT) and Wholesale price index (LnWPI).

**Table 3: Correlation coefficients of Stock index, Exchange rate, Gold price Interest rate and Wholesale price index**

*The correlation coefficients are calculated for LnNEPSE, LnER, LnGP, LnINT and LnWPI. The variables for which correlation tests are conducted are defined below.*

*LnNEPSE = Natural logarithm of Nepal Stock Exchange index value,*

*LnER = Natural logarithm of Exchange rate of NPR per USD,*

*LnGP =Natural logarithm of Gold Price per troy ounce,*

*LnINT = Natural logarithm of Annual interest rate of 91-days treasury bill, and*

*LnWPI =Natural logarithm of Wholesale price index.*

	LnER	LnGP	INT	LnNEPSE	LnWPI
LnER	1.0000				
LnGP	0.6410*	1.0000			
INT	-0.5678*	-0.2522*	1.0000		
LnNEPSE	0.5605*	0.6754*	-0.2387**	1.0000	
LnWPI	0.7500*	0.9680*	-0.3284**	0.7690*	1.000

\*Significant at 1% level.

\*\*Significant at 5% level.

Table 3 shows the positive correlation coefficient of 0.5605 between stock index (LnNEPSE) and exchange rate (LnER). Among these macroeconomic variables the highest correlation coefficient positive 0.9680 is observed between gold price (LnGP) and stock index (LnWPI). Similarly, the lowest correlation coefficient negative 0.2387 is observed between interest rate (INT) and stock

index (LnNEPSE). Similarly, the correlation coefficient between stock index (LnNEPSE) and gold price (LnGP) is positive 0.6754. On the other hand the negative correlation between stock index (LnNEPSE) and interest rate (INT) has been observed. Finally, the correlation coefficient between LnNEPSE and LnWPI 0.7690 is observed.

## 6.2 Regression analysis

The impact of macroeconomic variables on stock index has been analysed through multivariate regression analysis. The result of multivariate regression analysis has been presented in Table 4. The coefficient of exchange rate (DLnER) is -0.111971 with t-statistics of -0.483175 and p-value of .6296, the coefficient of gold price (DLnGP) is 0.157772 with t-statistics of 0.691619 and p-value of .4902, and the coefficient of interest rate (LnINT) is -0.007608 with t-statistics of -2.590398 and p-value of .0105. The coefficient of wholesale price index (DLnWPI) is 0.887642 with t-statistics of 32.928682 and p-value of .0039. The coefficient of exchange rate and gold price is statistically insignificant at 5 percent level of significant but the coefficient of the interest rate and wholesale price index is significance at 5 percent and 1 percent level of significance respectively. The value of adjusted R-square is 0.063546. Similarly, the F-statistics 3.3833086 indicates that the model is fit at 5 percent level of significance.

Thus, this multivariate regression result confirms that interest rate and wholesale price index has explanatory power in explaining stock index of Nepal stock index.

**Table 4: Regressions result of NEPSE on exchange rate, Gold price, Interest rate and wholesale price index**

*This table shows the results of regression analysis for the period of January 2000 to November 2016 by using following multivariate regression model.*

$$DLn(NEPSE)_t = \beta_0 + \beta_1 DLnER_t + \beta_2 DLnGP_t + \beta_3 LnINT_t + \beta_4 DLnWPI_t + \varepsilon_t$$

*Dependent variable is the Nepse stock index denoted as (DLnNEPSE) and independent variables are Exchange rate of NPR/USD (DLnER), Gold price (DLnGP), Interest rate (LnINT) and Wholesale price index(DLnWPI). The t- statistics, F-statistics, p-value, and adjusted R<sup>2</sup> are also reported.*

Variable	Coefficient	t-statistics	p-value
Constant	0.006822	1.173549	.2423
<b>DLnER</b>	-0.111971	-0.483175	.6296
<b>DLnGP</b>	0.157772	0.691619	.4902
<b>LnINT</b>	-0.007608	-2.590398**	.0105
<b>DLnWPI</b>	0.887642	32.928682*	.0039
<b>Adjusted R-squared</b>	0.063546		
<b>F-statistics</b>	3.3833086*		.00527
<b>Durbin-Watson Test</b>	1.752153		
<b>Number of observation</b>	168 after adjustment		

\*Significant at 1% level.

\*\*Significant at 5% level.

## 7. Summary and conclusion

This study has performed necessary analyses to identify the impact of macroeconomic variables on stock index. For this purpose 91 days treasury bill interest rate as proxy for interest rate, local

currency NPR per US dollar as proxy for exchange rate, gold price in NPR per troy ounce as proxy of gold price, wholesale price index and finally market index as proxy for the stock market are considered.

This study has considered the monthly data from January 2002 to December 2016. The relationship between macroeconomic variables and stock index has been analysed through correlation analysis and the impact of macroeconomic variables on stock index is analysed through multiple regression analysis. As per the findings of other studies such as Chen *et. al.*, 1986; Fama and French, 1988, Mayasmi and Koh, 2000; Joseph, 2012, Izedonmi and Abdullahi, 2011; Rostamy, Hosseini, Bakhshitanlou, 2013; Hussinet. *al.*, 2013; and Geete, 2016, etc. this study also observed significant relationship between some macroeconomic variables and Nepalese stock index.

The correlation analysis of this study concluded that there is positive relationship between gold price (LnGP) and stock index (LnNEPSE). Similarly, this study also confirmed the positive relationship between stock index (LnNEPSE) and exchange rate (LnER). The positive relationship between stock index and exchange rate is similar with the study of Aggarwal (1981) but it contradicts with the result of Soenen and Hennigar (1988) and Kuwornu (2011) they found negative relationships between these two variables. Furthermore, this study also confirmed the positive correlation between stock index (LnNEPSE) and wholesale price index (LnWPI). On the other hand the negative relationship between stock index (LnNEPSE) and interest rate has been observed. The negative relationship between stock index (LnNEPSE) and interest rate was also confirmed by Humpe and Macmillan (2009) and Kuwornu (2011). But negative relationship between stock index (LnNEPSE) and interest rate contradicts with the result of Ratanapakorn and Sharma (2007). They reported positive relationship between S&P 500 and Treasury bill rate in US.

Similarly, the regression analysis of this study concluded that exchange rate and gold price has no explanatory power in explaining stock index of Nepal stock index. The coefficient of exchange rate and gold price is insignificant at 5 percent level of significance in regression equation. On the other hand the coefficient of interest rate (INT) is negatively significant at 5 percent level of significance and the coefficient of wholesale price index (WPI) is positively significant at 1 percent level of significance. Thus, this study concluded that the interest rate and wholesale price index has strong explanatory power for explaining stock index and they have greater effect on stock market index than exchange rate and gold price in Nepalese stock market.

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# **Asset liquidity and capital structure: Empirical evidence from Nepal**

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## **Abstract**

*In corporate finance, the capital structure choice and its components is viewed as one of the most important research area. In this regard, a study has been carried out on asset liquidity and capital structure in the Nepalese non financial listed firms from 2005 to 2014. The study is based on pooled cross sectional data of 18 firms whose securities are traded on Nepal Stock exchange. Multivariate regression analysis is employed to answer the research question as to what extent liquidity influences on capital structure. Result reveals that decision making on the capital structure is highly influenced by liquidity position of the non financial firms. It shows that leverage is positively associated to asset liquidity. Due to the result, the firm should focus on the liquidity management to have financing decision on the capital structure which augment the firm value in long-run perspective.*

**Key words:** Liquidity, leverage, transaction cost, times interest earned ratio

**JEL Classification:** G32, G34

## **1. Introduction**

In corporate finance, the impact of the liquidity of a firm's assets on capital structure has been a source of discussion for many years. There are few schools of thought such as optimal capital structure, pecking order, market timing theory in this regard. Williamson (1988) and Shleifer and Vishny (1992) predict that asset liquidity increases optimal leverage, while Morellec (2001) and Myers and Rajan (1998) argue that its effect is negative or curvilinear. In their cross sectional study of the determinants of capital structure, Rajan and Zingales (1995) examine the extent to which, at the level of individual firm, gearing may be explained by four key factors, namely, market to book ratio, tangibility, profitability and size.

Myers and Majluf (1984) argue that because of information asymmetry-induced financing constraints, firms should stock up on liquid assets to finance future investment opportunities with internal profits. Since there are no offsetting costs to liquid assets in their model, the optimal amount of liquidity is a corner solution. In contrast, Jensen (1986) argues that firms should be forced to pay out funds in excess of the amount necessary to finance all positive NPV investments to minimise the agency cost of free cash flow. In the absence of a benefit from liquid assets, Jensen's analysis implies that the firm would optimally carry no liquid assets. This analysis includes the liquidity asset and its impact on leverage. Shleifer and Vishny (1992) suggest that industries with higher cash flows are more likely to be able to finance asset acquisition.

Myers and Rajan (1998) and Morellec (2001) argue that the effect of asset liquidity on leverage is positive only when managers have no discretion over firms' assets, which reduces the risk of wealth expropriation. If managers have discretion over assets, Morellec (2001) examines that asset

liquidity will have a negative effect on leverage, whereas Myers and Rajan (1998) predict a curvilinear relation. There is positive relation between the liquidity index and level of secured debt.

Shleifer and Visny (1992), Maksimovic and Phillips (2001), and Schlingemann et al. (2002) present evidence that the liquidity is positively associated to the liquidity of firms' assets, it is nonetheless, associated to corporate control transactions. The empirical findings of this paper are more or less consistent with the theories that predict the effect of liquidity on capital structure choice.

Kajananthan and Achchuthan (2013) document that firm's decision on capital structure is highly depending on the liquidity management of the Sri Lanka Telecom Plc. According to them, the firm should focus on the liquidity management to take the decision on the capital structure which should lead to the firm's value in the long term perspective. Maximising the value of the firm and minimising the capital cost are the two pillars of the firm in order to sustain into the capital market. This study attempts to extend the knowledge of asset liquidity and capital structure in listed non financial firms in Nepal. Its objective is to find out how corporate liquidity affects the firms financing decision.

The reminder of this paper proceeds as follows. Section 2 includes the theoretical framework, empirical reviews existing evidence on asset liquidity. Section third describes the research methodology, nature and sources of data, section four presents the main results. Section five, summarises the findings and discusses how these findings relate to recent studies.

## **2.Theoretical framework**

### **2.1 Review of literature**

Huberman (1984) develops a model that can yield an interior optimal level of investment in liquid assets. He assumes that firms cannot use external financing to fund investment in production, requiring instead that such investment be financed with liquid assets. Similarly, Martin and Morgan (1988) argue that optimal investment in liquid assets in a model where liquid assets earn a low return, but given uncertain future funding requirements and costly external financing, may nevertheless be held. Adopting a cost minimisation objective, they derive conditions under which firms maintain liquidity position, i.e., the firm either holds no liquid assets or hold more than enough liquid assets to cover any future financing deficit. In an empirical study of the impact of liquidity constraint on bank lending policy, David (2000) examines the extent to which the banks provision of loans, external funding for the firm may be explained by the liquidity position of the borrower. Further banks are unable to provide new funds for borrowers who are short of cash, because either the return on investments is poor, or depositors withdraw more funds than expected.

Titman and Wessels (1988) and Rajan and Zingales (1995) produces evidence to suggest a positive relation between tangibility, which they define as the ratio of fixed assets to total assets and capital structure. According to them, result may reflect the fact that debt may be more available to a firm which has high amounts of collateral upon which to secure debt, thus reducing agency problem. The determinants of capital structure appear to vary significantly, depending upon which component of debt is being analysed. Rajan and Zingales (1995) find a negative relation between leverage and market to book ratio which indicates that firm tends to issue debt while market price is undervalued. However, this coefficient tends to be small and not universally significant in their study.

The study of Rajan and Zingales (1995), Titman and Wessels (1988) reveal that firm size and capital structure has positive relation. Danbolt (2002), Myers and Majluf (1984) predict that

profitability and leverage has negative association results that firms tend to employ internal funds to external equity for investment. Indeed, profitability has generally the strongest explanatory power of the cross sectional variation in UK gearing levels.

Myers and Rajan (1998) predict that asset liquidity increases the costs of managerial discretion. That is managers can sell assets and divert value from bondholders, and higher asset liquidity makes it less costly to do so. Thus, higher asset liquidity increases the expected value dilution, increases the costs of debt, and causes firms to use less debt. Finally, the evidence indicates that the effect of asset liquidity on leverage depends on the combination of the positive effect of asset liquidity on secured debt and the curvilinear effect of asset liquidity on unsecured debt.

Williamson (1988) and Shleifer and Vishnu (1992) result that more liquid assets increase optimal leverage. Williamson (1988) argues that assets that are more liquid, or more deployable, should be financed with debt more often, because banks and public debt markets incur lower costs from financing these assets. Signaling effect theory, proposed by Ross (1977) asserted that investors believe higher levels of debt will imply higher quality and higher future cash flows. This means that lower quality firms with higher expected costs of bankruptcy at any level of debt cannot follow the steps of higher quality firms by incurring more debt. Litzenberger (1973) documents that there is positive association between liquidity and leverage.

Liquidity and cash management affect corporate financing decisions, often in ways that are not as ‘deep’ as the factors driving academic models in the survey result (Graham and Harvey, 2001). For instance, many companies issue long term debt so that they do not have to refinance in bad times. The CFOs also say that equity is often issued simply to provide shares to bonus/option plans particularly among investment grade firms.

From the aforementioned studies, it may be seen that impact of liquidity on capital structure has been observed a controversial issue. Some studies result that there is a statistically and positively association between asset liquidity and capital structure while other did not. In order to test one view or the other in the Nepalese context, no study has so far been conducted. This study therefore tests the association between asset liquidity and capital structure in Nepalese context.

## **2.2 Determinants of asset liquidity and capital structure**

Asset liquidity and capital structure of an enterprise is determined by various internal and external factors. The macro variables-market condition, tax policy of government and inflation rate are the major external factors whereas profitability, sales, liquidity, tangibility, depreciation, etc. are the micro factors affect the firm’s capital structure. This section presents how some of these characteristics affect the capital structure of a firm with reference to the related capital structure theory.

**Liquidity:** Firms with higher liquidity ratios might support a relatively higher debt ratio due to greater ability to meet short term obligation when they fall due. Van Horne (1974) indicated that the greater the firms’ projected liquidity posture, including its cash flow generating capacity, the greater its debt capacity. Similarly, higher existing liquidity positions would be associated firms electing to raise more debt capital. The liquidity can be measured as corporate transaction scaled by total assets. Sibilkov (2009) asserts that leverage is positively associated to asset liquidity.

**Size:** The bankruptcy cost theory explains the positive association between the firm size and leverage. The large firms are more diversified (Remmers et al., 1974), have easy access to the capital market, receive higher credit ratings for debt issues, and pay lower interest rate on debt capital (Pinches and Mingo, 1973). Further, larger firms are less prone to bankruptcy (Titman and Wessels, 1988) and this implies the less probability of bankruptcy and lower bankruptcy cost.

However, Logue and Merville (1972) indicated that larger firms are usually found in older, more mature industries and enjoy a greater scopes with respect to potential financing media than smaller firms that have difficulty marketing long term debt issue and rely more heavily on equity financing. Log of total book assets has been used in this study as size of the firm following Sibilkov (2009).

There are several reasons to include firm size as a determinant of firm capital structure. Given the fact that large firms are likely to be more diversified and hence less prone to financial distress, one would expect a positive association between size and leverage decision. A number of authors (e.g., Warner (1977); Ang, Chua and McConnell (1982)) also suggested that direct financial distress cost is inversely related to firm size. Moreover, if the capital market is characterised by transaction costs associated with issue of new shares, one might expect size to play an important role in determining capital structure. Smith (1977) argues that as small firms pay much more than large firm to issue equity, they tend to be more leveraged. The natural logarithm of total asset (FS) is used as a proxy of size.

**Market to book:** Barclay et al. (1995), Rajan and Zingales (1995) and Danbolt and Bevan (2002) predict that market to book ratio and leverage has negative relation. This variable is often seen as proxy of investment opportunities but may also be associated to market mis-pricing of equity (rajan and Zingales, 1995). It is calculated as the ratio of book value of total assets less the book value of equity plus market value of equity, to the book value of total assets. Consistent with Barclay et al. (1995), Baker and Wurgler (2002), Hovakimian (2006) also predict that market to book ratio has negative relationship with leverage.

**Tangibility:** Firms with higher level of fixed assets are expected to have higher level of leverage. As such asset tangibility constitute good collateral for the loan. Scott (1977) argue that a firm can increase the value of equity by issuing collateralised debt when current creditors do not have such guarantee. Titman and Wessels (1988), Rajan and Zingales (1995) reported that there is a positive relationship between tangibility and leverage whereas Casser and Holmes (2003) reported a negative relation between tangibility and leverage.

**Profitability:** Myers (1984), Myers and Majluf (1984) indicate that firms prefer retained earnings as their main source of financing investment where the second choice is straight debt and the last choice comes from external equity. All other things held constant, the more profitTable the firms are, the more internal financing the firms have and therefore it would be expected a negative relationship between capital structure and profitability. However, the trade off theory predicts that there is a positive relation between capital structure and profitability. As past profitability is a good proxy for future profitability, profitTable firms can borrow more as the likelihood of paying back the loan is greater. Silwal (2015) reveals that there is an inverse relationship between profitability and leverage.

**Non debt tax shield:** DeAngelo and Masulis (1980) present a capital structure model where non debt tax shields serve as substitute for the interest expenses that are deductible in the calculation of corporate tax. They argue that non debt tax shield is a substitute for the tax benefit of debt financing. Thus a firm with a large non debt tax shield is likely to be less leveraged. Therefore, an inverse relationship is expected in between non debt tax shield and capital structure. Following Titman and Wessels (1988), the ratio of annual depreciation expenses to total assets is considered as proxy for non-debt tax shield.

**Leverage:** With creditors, owners, and managers all having an interest in the longevity of the enterprise, limitation or benchmark develop that influence the amount of debt capital raised by the enterprise, resulting in conventional capitalisation and earnings coverage standard (Cohen and

Robbins, 1966). The financial ratio that measures the extent of an enterprise's leverage employed as the ratio of total debt to total assets.

Table 1 summarises the discussion on the determinants of asset liquidity and capital structure and their measures and their expected relationship with leverage as the hypothesis estimated.

**Table 1: Potential determinants of asset liquidity and capital structure, their measures, and expected relationship with leverage**

Determinants	Proxy measure	Hypothesis
Liquidity	Corporate transaction deflated by book assets	Positive
Size	Log of total assets	Negative
Market to Book	Sum of book assets with market equity less Book equity deflated by total book assets	Negative
Tangibility	Property, plant and equipment normalized by total assets	Positive
Profitability	Operating income deflated by total assets	Negative
Non debt tax shield	Total non cash expenses scaled by total assets	Negative

### **3. Research methodology**

#### **3.1 Nature and source of data**

This study is based on secondary data. The main source of data is Nepal stock exchange and Security Board of Nepal data base. Further, data were collected from annual financial report of respective non financial firms from 2005 to 2014. For the purpose of this study, population has been defined in term of the number of enterprises listed on NEPSE as on mid July 2015. As on this date total number of non financial firms falling in different four groups- manufacturing and processing, hydro, trading, hotel and others-were 33. Out of these, depending upon the availability of data, 18 listed enterprises-7 manufacturing and processing, 4 hydro, 3 hotels, 3 trading and 1 other are selected as sample of this study.

Financial enterprises such as banks, developments banks, and financial institutions are excluded from the study due to their different nature of financial statement. The study has employed descriptive, causal comparative and correlational research design in order to achieve the study objectives. It is hypothesised that there is no significant relationship between firm specific characteristics and leverage.

#### **3.2 Model specification**

Multivariate regression analysis is used to determine the asset liquidity and capital structure in Nepalese context. Six explanatory variables have been used for the purpose of this study.

Leverage = f (Liquidity, firm size, market to book, tangibility, profitability, non debt tax shield)

#### **In equation form,**

$$Y_{it} = \alpha_{it} + \beta X_{it} + \mu_{it}$$

Where,

i= 1,.....,N and t=1,.....T

$Y_{it}$  = Leverage of a firm I in year t

$\alpha$ =constant of equation

$\beta$ =6x1 vectors constant (i.e., slope of variables)

$X_{it}$ = a vector of 6 time varying regressors (i.e., explanatory variables), and

$\mu_{it}$ = error terms independently and identically disturbed with zero mean

### In specific form

$$\text{Lev}_1 = \alpha_0 + \beta_1 \text{LI} + \beta_2 \text{FS} + \beta_3 \text{MB} + \beta_4 \text{PPE} + \beta_5 \text{ROA} + \beta_6 \text{NDTS} + \mu_{it} \quad (\text{i})$$

$$\text{Lev}_2 = \alpha_0 + \beta_1 \text{LI} + \beta_2 \text{LI}^2 + \mu_{it} \quad (\text{ii})$$

## 4.Empirical analysis

### Descriptive statistics

Since the descriptive statistics are powerful tools to have an idea of distribution of the variables, some of the most frequently used statistics, like minimum, maximum values, mean, standard deviation and number of observation associated with selected variables in this study have been presented and analysed in the Table 1. This Table contains the summary statistics from 2005 to 2014 associated with 172 listed observations of non financial firms.

Table 1 reveals the summary statistics of selected average ratios of the variables employed in this study. The mean (median) value of leverage of sample firms is 0.54 (0.60) whereas its minimum and maximum values are 0.02 and 0.97 respectively. It indicates that Nepalese non financial firms have 54% debt employed in their total assets. The minimum liquidity of zero and maximum of 1.3837 have been observed in the non financial firms and on an average these firms have 0.54 liquidity index. The range of market to book ratio of 0.0227 to 11.54 has been observed and on an average of sample firms is 1.91 times which indicates that market price of stock has been fluctuated widely.

**Table 1: Descriptive statistics**

*This Table presents descriptive statistics for the variables employed in this study of all the firms listed on NEPSE excluding financial firms. The data are from NEPSE and SEBON and sample contains 19 non financial firms for the period of 2005 to 2014. Lev is the ratio of total book debt scaled by total assets, liquidity ratio is corporate transaction deflated by total assets. Although unreported regressions also include size, market to book ratio, tangibility, profitability and non debt tax shield. Size is the log of total assets, market to book ratio is the book value of total assets minus book value total equity plus market value of equity divided by book value of equity, PPE is the net of property, plant and equipment scaled by total book assets, profitability is the EBITD scaled by total assets, and non debt tax shield is the non tax expenses scaled by book assets.*

Variables	Mean	Median	SD	Minimum	Maximum	N
Leverage	0.5364	0.5965	0.2562	0.0165	0.9732	171
LI	1.3837	0.5443	2.3046	0.0000	15.0312	172
FS	6.9683	6.9655	1.5595	3.8600	11.4700	172
MB	1.9093	1.2309	1.8017	0.0227	11.5389	167
PPE	0.4949	0.4808	0.2815	0.0323	0.9674	172
ROA	0.1567	0.1265	0.1377	-0.2233	0.7402	172
NDTS	0.0468	0.0360	0.0472	0.010	0.2793	172

The tangibility of the sample firm ranges from minimum 3.23 percent to maximum 96.74 percent with average of 50 percent. The Table 1 also reveals the ranges of log of assets from 3.86 to 11.47 with average of 6.96 million and standard deviation of 1.56 million.

Table 1 also shows the ranges of profitability from minimum -22.22 percent to maximum 74.02 percent with average 15.67 percent. The result reveals that sample firms have average profitability is 15.67 percent. Similarly, non-debt tax shield has mean value of 4.68 percent and standard deviation of 4.72 percent with minimum to maximum range of 1 percent to 27.93 percent.

## Correlation

To test the possible multicollinearity among the explanatory variables, Pearson's co-efficient of the correlation test has been carried out and presented in Table 3. As depicted by this Table, the multicollinearity problem is not too severe among the selected explanatory variables. Before presenting the results of model estimation, it is worth to determine the degree of correlation coefficients between the independent variables as it would assist to analyse the regression. Higher the degree of correlation, higher would be the chances of misinterpretation of association among the variables.

**Table 3: Estimated correlation among explanatory variables**

*The Table presents the Pearson's correlation coefficients for explanatory variables employed in this study. The sample consists of 172 firm years from the annual report of listed firms in NEPSE for the period of 2005 to 2014. Liquidity ratio is corporate transaction deflated by total assets, size is the log of total assets, market to book ratio is the book value of total assets minus book value total equity plus market value of equity divided by book value of equity, PPE is the net of property, plant and equipment scaled by total book assets, profitability is the EBITD scaled by total assets, and non debt tax shield is the non tax expenses scaled by book assets.*

	LI	size	MB	PPE	PRO	NDTS
LI	1					
Size	-0.153	1				
MB	0.783	-0.124	1			
PPE	0.028	0.041	-0.188	1		
PRO	0.412	0.102	0.584	-0.217	1	
NDTS	-0.081	0.054	0.195	-0.053	0.444	1

It is apparent that a coefficient of market to book with liquidity index is highly correlated but still less than 0.8, but no other predictor variables have high correlation coefficients among the variables. As shown in the Table 3 the correlation coefficients between variables are highly acceptable and not indicating any collinearity problem.

## Determinants of capital structure

Table 4 presents the output of regression analysis of data from non financial firms where six explanatory variables are regressed on the leverage. The coefficient of the independent variables with their respective significance t-values is reported in the Table. The first six models include one of the six explanatory variables at a time. Model 7 to 9 include different combinations of the independent variables and model 10 comprises all the six variables simultaneously. The results are expected and encouraging and more or less similar to the results produced by Sibilkov (2009). The capital structure is positively influenced by liquidity index, asset tangibility and non debt tax shield but liquidity index is only the variable found to statistically significant whereas firm size,

market to book ratio and profitability have been found to be negatively and significantly related with leverage while running the regression individually.

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**Table 4: Determinants of capital structure**

*The Table presents the regressions of leverage on firm specific variables for the non financial listed firms on NEPSE from 2005 to 2014. In addition, t-values of each regression coefficients are also provided to have the information regarding the significance of the coefficients of the firm specific variables selected in this study. Lev is the ratio of total book debt scaled by total assets, liquidity ratio is corporate transaction deflated by total assets. Although unreported regressions also include size, market to book ratio, tangibility, profitability and non debt tax shield. Size is the log of total assets, market to book ratio is the book value of total assets minus book value total equity plus market value of equity divided by book value of equity, PPE is the net of property, plant and equipment scaled by total book assets, profitability is the EBITD scaled by total assets, and non debt tax shield is the non tax expenses scaled by book assets.*

Model	Intercept	Regression coefficients of						Adj R <sup>2</sup>	F	Sig
		LI	FS	MB	PPE	ROA	NDTS			
1	0.596	0.243						0.146	30.134	0.00
	28.215	(5.489)*								
2	0.963		-0.061					0.135	27.473	0.00
	11.545		(5.241)*							
3	0.652			-0.057				0.158	32.111	0.00
	24.813			(5.667)*						
4	0.526				0.022			0.005	0.097	0.756
	13.237				(0.311)					
5	0.627					-0.575		0.091	17.929	0.00
	22.093					(4.234)*				
6	0.515						0.448	0.001	1.167	0.282
	18.658						(1.08)			
7	1.153	0.141	-0.073	-0.031				0.357	31.707	0.00
	15.029	(2.555)*	(7.078)*	(1.934)**						
8	1.167		-0.07	-0.065	-0.034			0.333	28.57	0.00
	14.012		(6.672)*	(7.133)*	(0.591)					
9	0.677			-0.043	-0.071	-0.503	1.361	0.213	12.241	0.00
	14.599			(3.602)*	(1.12)	(2.941)*	(3.327)*			
10	1.129	0.157	-0.069	-0.043	-0.022	-0.273	1.125	0.376	17.65	0.00
	13.847	(2.976)*	(4.647)*	(2.106)**	(0.355)	(1.74)	(2.701)*			

Figures in the parenthesis are t-values, \* significant at 10% level, \*\* significant at 5% level and \*\*\* significant at 10% level

The firms with higher asset liquidity, as measured by liquidity index, enjoy higher leverage. The negative coefficient on market to book ratio and profitability are consistent with Rajan and Zingales (1995) and Myers and Majluf (1984) for the Nepalese firms. The economically significant market to book ratio results that firms tend to raise the external capital by issuing equity

while market price becomes undervalued and debt while it becomes overvalued. Similarly, the firm with higher profit tends to use internal equity and if it is not sufficient to finance new project then tend to raise fund by issuing debt first and new equity as the lending of the last resort.

Model 7 attempts to unravel the separate influence of liquidity, firm size and market to book on capital structure. The t-statistics and p-value suggest that the coefficients are estimated with a high degree of precision. However, the magnitude of liquidity is highly influenced on leverage. In model 8 liquidity is replaced by the asset tangibility but two of them are as in model 7 are found to be significant and it shows that asset tangibility has no explanatory role in determination of leverage. In model 9, four of the six variables are included and the result of t- statistics indicate that market to book, profitability and non debt tax shield coefficients are more significant, and therefore, these variables have more explanatory power. Surprisingly, the significant role of non debt tax shield is predicted while combining the variables together in determination of leverage. But the result is not consistent with DeAngelo and Masulis (1980).

In model 10, when all the explanatory variables are simultaneously included, four of the six variables have been found to be significant. The results suggest that asset tangibility and profitability may not have important role in predicting leverage decision. In line with the previous study, asset liquidity, as measured my corporate transaction, the results indicate that the firm with higher liquidity and the firm with more corporate transaction should have higher leverage. In addition, firm size is found to be negatively significant, indicates that the firm with larger assets with more fixed assets should have lower leverage and the result is consistent with Logue and Merville (1972). The model as estimated in Table 4 is found to be strong as revealed by F-statistics and adjusted R-square.

The positive and significant liquidity index indicates that firms with higher liquidity ratios might support a relatively higher leverage due to greater ability to meet short-term obligations when they fall due.

It is concluded that assets that are more liquid, or more deployable, should be financed with debt more often, because banks and public debt markets incur lower costs from financing these assets.

### **Determinants of leverage by asset tangibility and interest coverage**

To get additional insight on the effect of liquidity on capital structure, it is developed further implications of Williamson's (1988) and Shleifer and Vishny's (1992) study on the basis of impacts of the amount of fixed assets in place and the probability of bankruptcy on the relation between asset liquidity and capital structure.

Williamson (1988) asserts that low asset tangibility enhances the cost of liquidation for lenders, who then limit the amount or raise the cost of debt for firms. If the expected liquidation values are greater than the value of debt, asset liquidity does not determine the payout to debt holders in the event of liquidation, so the relation between asset liquidity and leverage will be stronger (weaker) for firms with fewer (more) tangible assets relative to debt.

Similarly, Shleifer and Vishny (1992) argue that the positive relation between asset liquidity and leverage results from managers who control the expected costs of distress and liquidation by reducing leverage levels when asset liquidity is low. Regardless of asset liquidity, if financial distress is low, managers will not reduce the level of debt. If so then the association between asset liquidity and leverage becomes weak. Thus, their views imply a weaker (stronger) relation between asset liquidity and leverage for firms with a lower (higher) probability of default.

To investigate these implications, following the study of Sibilkov (2009), the sample has been breaking down into relative asset tangibility and interest coverage ratio. Interest coverage ratio is the financial indicator of probability of default, assuming that the probability of default is lower for those firms whose ratio of tangibility value to the value of debt falls above or below 0.5.

Similarly, high or low interest coverage ratio firms are those whose ratio of TIE is greater or less than 5. This demarcation is used in finding the relation between asset liquidity and capital structure in the Nepalese context as data reveal the asset tangibility is within the range of 1 and interest coverage is highly diversified. Table 5 presents the impacts of capital structure while samples are divided on the basis of asset tangibility and interest coverage ratio.

Once breaking the sample by relative asset tangibility, the coefficient of liquidity index for the low tangibility category emerges as positive and significant at 1 percent level of significance whereas coefficient of high asset tangibility category is lower in magnitude at same level of significance. P-value rejects the equality of the coefficients in two subsamples. It indicates that the relation between asset liquidity and capital structure is stronger when there are lower fixed assets comparing with leverage. While running the regression including both variables, i.e., liquidity index and liquidity index square, asset liquidity is found to be highly significant with higher magnitude at 1 percent level results that the relation between asset liquidity and debt outstanding is again much stronger when there are lower tangible assets relative to leverage.

**Table 5: Determinants of capital Structure by asset tangibility and Interest coverage**

*Table 3 presents the result based on pooled cross-sectional data of 19 firms with 181 observations from NEPSE and SEBON data base for the period of 2005 to 2014 by using linear regression model for the non financial firms. The sample is partitioned by relative asset tangibility and interest coverage ratio. High (low) relative asset tangibility firms are those whose ratio PPE value to the debt is greater (less) than 0.5. How (low) interest coverage ratio for firms are those whose ratio of TIE is greater (less) than 5. The dependent variable is debt over total assets. The liquidity ratio is current assets scaled by total assets. Although unreported regressions also include size, market to book ratio, tangibility, profitability and non debt tax shield. Size is the log of total assets, market to book ratio is the book value of total assets minus book value total equity plus market value of equity divided by book value of equity, PPE is the net of property, plant and equipment scaled by total book assets, profitability is the EBITD scaled by total assets, and non debt tax shield is the non tax expenses scaled by book assets.*

	Low	High	Low	High
Panel A relative asset tangibility				
Liquidity index	0.161 (4.83)*	0.112 (3.196)*	0.246 (10.286)*	0.128 (4.064)*
Liquidity index square			-0.022 (8.409)*	0.08 (3.207)*
F-value	23.326	10.212	56.472	10.835
P-Value	0.000	0.000	0.000	0.000
Adj.R2	0.204	0.101	0.56	0.193
Observations	87	82	87	82
Panel B Interest coverage ratio				
Liquidity index	0.241 (3.196)*	0.111 (1.992)**	0.365 (2.267)**	0.148 (3.675)*
Liquidity index square			0.21 (1.452)	0.011 (3.365)*
F-Value	10.211	5.863	3.373	6.794
P-Value	0	0.038	0.028	0.002
Adjusted R <sup>2</sup>	0.112	0.562	0.065	0.113
Observations	78	91	78	91

Figures in the parenthesis are t-values, \* significant at 1% level, \*\* significant at 5% level

While forming the group on the basis of times interest earned ratio, the coefficient on asset liquidity for the low times interest coverage subsample is greater than that for high times interest

coverage subsample, though both coefficients are statistically significant, however, the lower interest coverage subsample has higher magnitude of coefficient in explaining the level of debt outstanding. The P-value and F-value reject the equality of the coefficients at 1 percent and 5 percent level of significance. It indicates the relation between asset liquidity and capital structure is stronger for firms with a higher probability of default, which is consistent with the hypothesis that if the probability of distress is low, the marginal effect of asset liquidity on the anticipated cost of distress will be low. The result of this Table is consistent with empirical evidence of Williamson (1988) and Shleifer and Vishny (1992), and Sibilkov (2009).

## Conclusion

This study mainly aims at examining the asset liquidity and capital structure in Nepalese non financial firms. Out of the six examined independent variables – liquidity, firm size, market to book, asset tangibility, profitability and non debt tax shield – four of them - liquidity, firm size, market to book, and profitability are economically and statistically significant determinants of capital structure. The result shows that liquidity index is positively associated with leverage. The finding is consistent with the hypothesis of Williamson (19880, Shleifer and Vishny (1992) and Sibilkov (2009) that asset liquidity leads optimal leverage of the firm. Managers of non financial firms should consider the pattern of asset liquidity while making leverage decisions. Asset liquidity obviously is more important for firms in determining the level of leverage. Firms tend to employ more debt while they have more liquidity transaction as measured by market equity to book assets. In addition, they should keep in mind the explanatory variables such as profitability, market to book ratio as these variables reflect negative association with leverage. Firms tend to issue debt while market price is undervalued and issue equity while it is overvalued.

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# **Bank specific and macroeconomic determinants of banking profitability in Nepal**

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## **Abstract**

*The aim of this study is to examine the bank-specific and macroeconomic determinants of the profitability in the Nepalese banking sector over the time period from 2004 to 2013. The study uses data from a sample of 51 Nepalese banks listed on NEPSE till mid-April 2013 with 510 observations for the study period. The bank profitability is measured by return on assets (ROA) and return on equity (ROE) as a function of bank-specific and macroeconomic determinants. Using a balanced panel data set, the results show that asset size and deposit to asset have a positive and significant effect on bank profitability. However, loans portfolio have a negative and significant impact on bank profitability. With regard to macroeconomic variables, only the real interest rate and stock market capitalisation affects the performance of banks positively. These results suggest that banks can improve their profitability through increasing bank size and non-interest income, decreasing credit/asset ratio. In addition, higher real interest rate and stock market capitalisation can lead to higher bank profitability.*

**Keywords:** Bank-specific characteristics, Macroeconomics, Financial institutions, Bank Profitability, Multiple Regression Analysis

## **1. Introduction**

Financial intermediaries perform key financial functions in economies; provide a payment mechanism, match supply and demand in financial markets, deal with complex financial instruments and markets, provide markets transparency, perform risk transfer and risk management functions. Banks are the most important financial intermediaries in the most economies that provide a bundle of different services. As financial intermediaries, banks play a crucial role in the operation of most economies. The efficiency of financial intermediation can also affect economic growth. Besides, banks insolvencies can result in systemic crisis. Economies that have a profitable banking sector are better able to withstand negative shocks and contribute to the stability of the financial system (Athanasoglou & Delis, 2005). Therefore, it is important to understand the determinants of banking sector profitability.

Early studies on bank profitability were provided by Bourke (1989). Then, in order to identify the determinants of bank performance, numerous empirical studies were held. In recent literature, the determinant of bank profitability is defined as a function of internal and external determinants. Internal determinants are related to bank management and termed micro or bank specific determinants of profitability (Kosmidou & Pasiouras, 2007). The external determinants are reflecting economic and legal environment that affects the operation and performance of banks. Kosmidou (2008) examined the determinants of performance of Greek banks during the years 1990 to 2002—the period of EU financial integration. The results suggested that the high return on average assets (ROA) was found to be associated with well-capitalised banks and lower cost to income ratios. Size was positive in all cases but statistically significant only when the macroeconomic and financial structure variables entered the models.

Molyneux and Seth (1998) analysed the performance of foreign banks in Australia over the period 1989 to 1993. The main finding of this study is that foreign banks with a full Australian license have a significantly lower market share with a return on asset (ROA) as dependent variable. Heffernan and Fu (2008) analysed the performance of different types of Chinese banks during the 1999 to 2006 period. They suggest economic value added and the net interest margin do better than the more conventional measures of profitability, namely return on assets (ROA) and return on equity (ROE). Some financial ratios and macroeconomic variables are significant with the expected signs. Saunders and Schumacher (2006) investigated the determinants of interest margins in six countries of the European Union and the US during the years 1998 to 2005. They suggest that macroeconomic volatility and regulations have a significant impact on bank interest rate margins.

Demirguc-Kunt and Huizinga (1999) used the bank level data for the period of 1988 to 1995 for 80 countries to examine how bank characteristics and the overall banking environment affect both interest rate margins and bank returns. Athanasoglou, Delis and Stakouras (2006) have analysed the effect of selected set of determinants on banks profitability in the South Eastern European region over 1998-2002 period. It is found that concentration is positively correlated with bank profitability and inflation has a strong effect on profitability while banks' profits are not significantly affected by real GDP per capita fluctuations. Sayilgan and Yildirim (2009) investigates the relationship between the return on assets and the return on equity ratio for a sample of Turkish banks for the 1998-2007-time period using monthly data. It is found that profitability positively affected by capital adequacy and negatively by growing off-balance sheet assets.

Most of the earlier studies had found the factors that influenced the profitability or performance of the banking industry in developed countries. Nevertheless, a few literatures looked into the profitability of the banks in the developing countries (Ross & Jordon, 2003). The existing gap evidenced through the literature has been addressed in this paper by identifying the potential internal and external determinants that may improve the profitability of the Nepalese banks. The study deals with the following issues:

- a) What are the factors/variables that influences the profitability of Nepalese bank?
- b) What kind of relationships exist between of bank profitability with bank specific and macroeconomic variables?
- c) Are there equal contributions of bank specific and macroeconomic variables in predicting bank profitability?
- d) What are the roles of CAMEL ratio in explaining the bank profitability?

As macroeconomic and legal environment changes, determinants of profitability banking sector might change as well. This paper attempts to examine the determinants of the profitability of Nepalese banks over the period 2004-2013, in Nepal. The rest of the paper is organised as follows: Section 2 describes research methodology; variables, data and research method, while Section 3 presents and analyses the empirical results. Conclusions are offered in the final section.

## **2. Research methodology**

### **2.1 Nature and sources of data**

This study is based on secondary sources of data. The secondary sources of data have been employed to understand the form of observe relation and to analyse predictive power of banks specific and macroeconomic variables in explaining the banks' profitability of Nepalese bank. Our

sample is a balanced panel dataset of 17 commercial banks, 17 development banks and 17 finance companies observed over the period 2004–2013 consisting of 510 observations. Because of using all bank specific variables for the banks in the entire period, Nepalese banks which shares are traded on the Nepal Stock Exchange (NEPSE) are included to the study. The bank-specific variables are derived from income statements and balance sheets of concerned banks. The financial statement data is collected from Nepal Rastra Bank (NRB) reports, Nepal Stock Exchange (NEPSE), websites of the banks and Security Board of Nepal (SEBON). With regard to the macroeconomic variables, the data of economic growth, inflation rate and interest rates are obtained from the World Bank and Nepal Rastra Bank (NRB) website.

## 2.2 Econometrics models

In this study, panel data regression model have been used. The balance panel data from 51 Nepalese banks for the period of 2004 to 2013 have been consisting of 510 observations. Asteriou (2006) argues that panel data models being more efficient methodology to control the chance of biased result by providing more degree of freedom on pooling the data. Based on the panel data, first of all pooled OLS model has been estimated in order to analyse overall impact of bank specific and macroeconomic variables on return on assets, return on equity and net interest margin of the banks without considering bank and time specific effect. The theoretical statement may be framed as under:

$$Y_{it} = f(\text{Bank specific variables}, \text{Macroeconomic variables}) \quad \dots \dots (1)$$

The equation to be estimated has, therefore, been specified as under:

*Where.*

$Y_{it}$  = Return on Asset (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) for bank  $i$  at time  $t$ .  $\alpha$  = Constant term, assume to be constant over time.  $\ln \text{SIZE}_{it}$  = Natural logarithm of Total Asset (SIZE) for bank  $i$  at time  $t$ .  $C/A_{it}$  = Ratio of equity capital to total Asset (CA) for bank  $i$  at time  $t$ .  $L/A_{it}$  = Ratio of Total Loans to Total Assets (LA) for bank  $i$  at time  $t$ .  $D/P_{it}$  = Ratio of Total Deposit to Total Assets (DP) for bank  $i$  at time  $t$ .  $LQD/A_{it}$  = Ratio of Total Liquid Assets to Total Assets (LQD) for bank  $i$  at time  $t$ .  $\ln \text{GDP}_{it}$  = Natural logarithm of Gross Domestic Product (GDP) for bank  $i$  at time  $t$ .  $\text{INF}_{it}$  = Consumer Price Index (INF) for bank  $i$  at time  $t$ .  $RI_{it}$  = Real Interest Rate (RI) for bank  $i$  at time  $t$ .  $\varepsilon_{it}$  = Stochastic error term

### 3. Results

### 3.1 Descriptive statistics

The basic descriptive statistics of the variables are presented in Table 2. Which provides summary statistics for the variables that are used in the analysis. For each variable, on average, banks in our sample have a return on assets ROA of 1.3098% and return on equity ROE 16.25% over the entire time period from 2004 to 2013. Also, the return on assets and return on equity has a negative skewness but positive and significant of kurtosis.

**Table 1. Descriptive statistics**

This table shows descriptive statistic of firm's specific and macroeconomic variables such as mean, median, standard deviation, minimum, maximum, skewness and kurtosis of banks associated

with 51 sample firms listed in the population of NEPSE till mid-July 2013 with 510 observations for the period 2004 through 2013. All data in table are in percentage.

<b>Variables</b>	<b>Mean</b>	<b>St. Dev.</b>	<b>Median</b>	<b>Min.</b>	<b>Max.</b>	<b>Skew.</b>	<b>Kurt.</b>
<b>Dependent variables</b>							
ROA	1.3098	2.9637	1.4100	-18.9200	18.0400	-2.5360	18.0400
ROE	16.2500	32.0392	20.1240	-218.3908	116.0215	-4.1250	116.0215
<b>Bank specific independent variables</b>							
Insize	9.9055	0.9907	9.9703	6.5147	11.6557	-0.6050	11.6557
C/A	0.0536	0.0514	0.0407	0.0057	0.5185	4.4270	0.5185
L/A	0.5530	0.1474	0.6025	0.1200	1.1200	-0.5840	1.1200
LQD/A	0.1377	0.0725	0.1230	0.1000	0.5800	2.2110	0.5800
D/A	0.7840	0.2144	0.8155	0.0800	3.0700	5.4790	3.0700
<b>Macroeconomic independent variables</b>							
lnGDP	13.5648	0.4240	13.4968	12.9980	14.1957	0.2060	14.1957
INF	6.8769	2.9267	6.7000	2.8000	12.6000	0.2280	12.6000
IR	4.4154	0.9893	4.4000	2.6000	6.4000	0.1420	6.4000
SMC	24.5136	9.9107	21.9423	11.7305	42.5264	0.8426	-0.1904

### 3.2 Correlation matrix

Correlation matrix between independent variables is presented in Table 3. Among the independent variables, size is observed to be negatively correlated with all other bank specific variables while as has a significant positive impact with macroeconomic variables except real interest rate. Capital has positive relation with all other independent variables except lnGDP and INF. Loan is found to be positive relation with all other independent variables except Insize. A strong positive correlation among the macroeconomic variables has been noticed the study period. Correlation analysis is applied to predict how independent variables affect the dependent variables. Another purpose of correlation is to test for multicollinearity problem, in other world whether independent variables are highly correlated with each other or not. These low correlation coefficients show that there is no multicollinearity problem.

**Table 2. Correlations matrix with banks specific and dependent variables**

*This table presents the bivariate Pearson correlation coefficients between different pairs of banks specific and macroeconomic variables on bank profitability. The correlation coefficients are based on the data on Banks specific and macroeconomic variables from 51 sample banks listed in NEPSE till mid-April 2013 with 510 observations for the period from 2004 to 2013.*

	ROA	ROE	Insize	CA	LA	DA	LOQ
ROA	1.00						
ROE	0.361**	1.00					
CA	0.015	<b>-0.381**</b>	0.129**	1.00			
LA	-0.142*	<b>-0.198*</b>	-0.312**	0.195**	1.00		
DA	0.115**	0.105*	-0.061	0.204**	0.379**	1.00	
LOQ	0.061	0.093*	0.278**	0.106*	-0.087*	0.041	1.00

\*\* Significant at the 0.01 level (2-tailed). \* Significant at the 0.05 level (2-tailed).

**Table 3. Correlations matrix with macroeconomic and dependent variables**

*This table presents the bivariate Pearson correlation coefficients between different pairs of banks specific and macroeconomic variables on bank profitability. The correlation coefficients are based on the data on Banks specific and macroeconomic variables from 51 sample banks listed in NEPSE till mid-April 2013 with 510 observations for the period from 2004 to 2013.*

	ROA	ROE	lnGDP	INF	IR	SMC
ROA	1					
ROE	0.361**	1				
lnGDP	-0.039	0.155**	1			
INF	0.494*	0.350*	0.254**	1		
IR	0.302*	0.348*	-0.056	0.367**	1	
SMC	0.665**	0.044	0.404**	0.727**	0.280**	1

\*\* Significant at the 0.01 level (2-tailed). \* Significant at the 0.05 level (2-tailed).

### 3.3 Empirical results from panel data analysis

The estimated relationship from cross-section regression of ROA and ROE on bank and microeconomic variables. The regression results of various models on firm size, capital adequacy, loan portfolio, Liquidity, deposit to asset, lnGDP, inflation, real interest rate and stock market capitalisation have been reported and summarised in this table 4, 5 and 6.

Table 4 shows the regression results of profitability on bank's specific variables based on pooled cross-sectional data of 51 firms listed on NEPSE with 510 observations from the year 2004 to 2013. In the model 1 to 5 by using univariate regression all coefficient of firms' specific is statistically significant on bank profitability (ROA). Model 9, when all bank specific is simultaneously included, only the t-statistics of Insize, loan portfolio, and deposit to asset have found to be significant. The result suggests that firm's size, loan portfolio and deposit to asset may be more important in predicting profitability (ROA) than other variables.

Table 5 shows the regression results of profitability on bank's specific variables based on pooled cross-sectional data of 51 firms listed on NEPSE with 510 observations from the year 2004 to 2013. In the model 1, to 4 the firms' specific variables like Insize, loan portfolio and capital adequacy are statistically significant on bank profitability (ROE). Model 9, when all bank specific is simultaneously included, only the t-statistics of Insize, capital adequacy and loan portfolio have found to be significant. The result suggests that firm's size capital adequacy and loan portfolio and deposit to asset may be more important in predicting profitability (ROE) than other variables.

Table 6 shows relationship from cross-section regression of return on asset and return on equity on macroeconomic variables. Panel A, model 1 to 4, all the macroeconomic variables have positive relation on ROA with significant t- statistics, which indicates explanatory power to explain in ROA. In model 8, when all the macroeconomic variables are simultaneously included, only the t - statistics of INF, IR and SMC have found to be significant and indicate explanatory power to explain in ROA.

Panel B, model 1 to 4, all the macroeconomic variables have positive relation on ROE with significant t- statistics, which indicates explanatory power to explain in return on equity (ROE). Model 5 and 6 represents the regressions that explain profitability (ROE) with macroeconomic variables provide insight into the relation between lnGDP, INF, IR, and SMC on ROA. In model 7, when all the macroeconomic variables are simultaneously included, only the t-statistics of IR and SMC have found to be significant and indicates explanatory power to explain in ROA. The result suggests that real interest rate and stock market capitalisation may be more important in predicting profitability (ROE) than other variables.

**Table 4: Estimation relationship from cross-section regression of ROA on bank specific variables for 51 samples banks with 510 observations during the period from 2004 to2013**

Dependent variables *ROA* is calculated as net profit divided total assets; *Size* is proxy measure of banks size, calculated as a natural logarithm of banks total assets; *Capital* is used as proxy measure of banks capital, calculated as total capital divided by total assets; *Loan* is used as proxy measured of loan intensity, calculated as total loans divided by total assets; *Liquid asset* is used as proxy measure of liquidity, calculated as total liquid asset divided by total asset; *Deposit* is used as proxy measure of banks deposit, calculate as total deposit divided by total assets; *GDP* is natural logarithm of gross domestic product; *INF* is consumer price index; *RI* is a proxy measure of real interest rate, calculated by nominal interest rate minus inflation rate. The applied equation is:  $ROA = \alpha + \beta_1 SIZE_{it} + \beta_2 CA_{it} + \beta_3 LA_{it} + \beta_4 DP_{it} + \beta_5 LQD_{it} + \epsilon_{it}$

<i>Models</i>	<i>Intercept</i>	<i>Regression Coefficients of</i>					<i>F</i>	<i>R</i> <sup>2</sup>	<i>SEE</i>
		<i>Insize</i>	<i>C/A</i>	<i>L/A</i>	<i>LOQ/A</i>	<i>DP/A</i>			
1	-1.665 (-1.560**)	-0.038 (-3.292*)					6.253*	0.110	1.258
2	1.390 (3.012*)		0.273 (3.112*)				4.259*	0.286	1.361
3	-1.835 (-1.431**)			-1.187 (-2.780*)			8.102*	0.133	1.464
4	-0.596 (-0.593)				0.281 (2.427**)		4.941*	0.186	1.244
5	-2.792 (5.518*)					0.516 (2.162**)	7.639*	0.181	1.360
6	-1.577 (3.717*)	-0.051 (-0.360*)	0.628 (0.240*)				11.423*	0.081	1.154
7	-3.31 (-2.545**)	-0.169 (-2.678*)	0.289 (1.978**)	-1.281 (-2.608**)			2.638**	0.158	1.323
8	-1.478 (-1.379)		0.726 (0.293)		3.237 (1.122)	1.981 (2.133**)	3.642*	0.267	1.334
9	-1.013 (-1.079)	-0.023 (-2.172**)	0.019 (0.262)	-0.010 (-2.427**)	0.052 (1.019)	3.219 (2.603*)	2.521**	0.129	1.336

The single asterisk (\*) sign indicates that result is significant at 1 percent level, double asterisk (\*\*) sign indicates that result is significant at 5 percent level.

**Table 5: Estimation relationship from cross-section regression of ROE on bank specific variables for 51 samples banks with 510 observations during the period from 2004 to2013.**

Dependent variables  $ROE$  is calculated as net profit divided total equity; Size is proxy measure of banks size, calculated as a natural logarithm of banks total assets; Capital is used as proxy measure of banks capital, calculated as total capital divided by total assets; Loan is used as proxy measured of loan intensity, calculated as total loans divided by total assets; Liquid asset is used as proxy measure of liquidity, calculated as total liquid asset divided by total asset; Deposit is used as proxy measure of banks deposit, calculate as total deposit divided by total assets; GDP is natural logarithm of gross domestic product; INF is consumer price index; RI is a proxy measure of real interest rate, calculated by nominal interest rate minus inflation rate. The applied equation is:  $ROE = \alpha + \beta_1 SIZE_{it} + \beta_2 CA_{it} + \beta_3 LA_{it} + \beta_4 DP_{it} + \beta_5 LQD_{it} + \epsilon_{it}$

Models	Intercept	Regression Coefficients of					F	$R^2$	SEE
		Insize	C/A	L/A	LOQ/A	DP/A			
1	-24.204 (-4.920**)	5.701 (9.503*)					1.121	0.109	2.915
2	-3.932 (-0.692)		-88.124 (6.892*)				3.873*	0.138	2.995
3	-25.384 (-2.844**)			-10.129 (-2.456**)			3.611*	0.038	1.804
4	-7.662 (-1.557)				0.652 (0.098)	8.659 (0.994)	2.027**	0.605	1.214
5	-70.533 (2.055**)	4.189 (6.724*)	-74.960 (-6.452*)				7.548*	0.137	1.518
6	-63.763 (-2.201**)	4.087 (6.338**)	-73.174 (-6.054*)	-9.575 (-1.982**)			7.468*	0.376	1.598
7	-17.074 (-2.550**)	3.668 (6.106**)	-72.399 (-6.051*)	-7.635 (1.968**)		7.586 (0.941)	3.725*	0.076	2.092
8	-2.142 (-0.207**)	3.197 (5.125**)	-72.286 (-6.033*)	-6.830 (-2.006**)	0.138 (0.016)	6.134 (0.925)	4.418*	0.098	1.275

**Table 6: Estimation relationship from cross– section regression of ROA and ROE on Microeconomic variables during the period from 2004 to 2013**

The table shows regression result of return on asset from the year 2004 to 2013. The regression results consist of various specifications of the models in the form of simple and multiple regressions. The reported values are intercepts and slope coefficients of respective explanatory variables with t-statistics in the parentheses. Dependent variable is the ROA represent bank profitability and macroeconomic independent variables are GDP (natural logarithm of gross domestic product); inflation (INF), real interest rate (IR) and stock market capitalisation (SMC). The reported results also include the value of F-statistic (F), adjusted coefficient of determinants ( $R^2$ ), and standard error of estimates (SEE). The single asterisk (\*) sign indicates that result is significant at 1 percent level, double asterisk (\*\*) sign indicates that result is significant at 5percent level. The applied equation is:

$ROA = \alpha + \beta_1 \ln GDP_{it} + \beta_2 INF_{it} + \beta_3 IR_{it} + \beta_4 SMC_{it} + \epsilon_{it}$				$ROE = \alpha + \beta_1 \ln GDP_{it} + \beta_2 INF_{it} + \beta_3 IR_{it} + \beta_4 SMC_{it} + \epsilon_{it}$				F	$R^2$	SEE		
Model	Panel A: Regression coefficients of			Panel B: Regression coefficients of								
	lnGDP	INF	IR	SMC	lnGDP	INF	IR	SMC				
1	0.585 (2.136**)				1.356 (2.747**)				7.468*	0.137	1.518	
2		0.954 (2.248**)				0.198 (0.243**)			3.725*	0.376	1.598	
3			3.679 (4.221*)				0.663 (4.155*)		31.121*	0.076	2.092	
4				0.078 (2.521**)				0.441 (3.566*)	3.873*	0.098	1.804	
5	0.484 (1.683)	0.812 (2.028**)			1.335 (1.986**)		0.784 (4.051*)		3.611*	0.109	1.214	
6	0.394 (1.219)	0.692 (2.008**)	3.524 (3.517*)		1.118 (1.562)	0.153 (0.146)	0.985 (3.698*)		2.027**	0.138	1.275	
7	0.179 (1.049)	0.458 (1.984**)	2.360 (2.983*)	0.069 (2.019**)	1.089 (1.426)	0.085 (0.087)	0.942 (3.554*)	0.652 (3.421*)	7.548*	0.038	2.915	

## 5. Conclusion

Profitability is an important criterion to measure the performance of banks, especially in the changing environment of banking. This study examines the firms' specific and macroeconomic determinants of bank profitability in Nepal. The study find that bank size has a positive and significant effect on profitability. It suggests that larger banks achieve a higher ROA and ROE. Also, the positive and significant coefficients of asset size variable provide evidence for the economies of scale theory. The ratios of loans/assets are found negative and significant impacts on ROA and ROE. This indicates that credit portfolio volume and weak asset quality impact negatively return on asset. Bank loans are expected to be the main source of income and are expected to have a positive impact on bank performance. However, it is found a negative relationship between loans and profitability. Another bank-specific variable, deposit/assets ratio has a positive and significant effect on ROA. This indicates that greater bank activity diversification positively influence returns. On the macroeconomic variables, only real interest rate and stock market capitalisation are found to having positive effect on profitability, as measured by ROA and ROE. When real interest rates are higher, profitability of banks rises.

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# Role of the government in promoting corporate social responsibility in Nepal

Bal Ram Chapagain, PhD<sup>1,2</sup>

## Abstract

*Despite the fact that corporate social responsibility (CSR) is increasingly regarded as one of the mainstream business agenda these days, government can also play a vital role in promoting CSR. Against this milieu, this study assesses the role of government in promoting CSR in Nepal and suggests the way forward for government and policy makers. To this end, relevant data were collected from structured questionnaires as well as semi-structured interviews with executives & managers of listed companies of Nepal. The data were analysed by using descriptive statistics as well as qualitative content analysis. Results indicate that the role of government in promoting CSR in Nepal is inadequate particularly in endorsing, collaborating and assisting responsible business practices. High degree of convergence was found between the results of structured questionnaire and semi-structured interviews regarding the executives & managers' suggestions to the government & policy makers for promoting CSR in Nepal. The main suggestions include 'giving tax incentives for designated CSR activities', 'formulate clear & adequate CSR act and regulations', 'create awareness on CSR', and 'reward & duly recognise socially responsible firms'. It implies that not only sticks but also carrots and sermons are important to promote CSR in Nepal.*

**Key Words:** Corporate social responsibility, government role, regulating, assisting, collaborating, endorsing, Nepal

## Introduction

Promoting corporate social responsibility (CSR) agenda by the government has become popular these days and it is likely that this trend will continue to grow in the coming years (Ascoli & Benzaken, 2009; Dentchev, Haezendonck & Balen, 2017). Government can play a key role in defining and promoting responsible business behaviour so as to address governance gaps and create a win-win situation between business and society (Schrempf-Stirling, 2018). Government can use legal instruments, fiscal-economic instruments, and informational instruments for promoting CSR (Steurer, 2015). Despite new legal provision for mandatory spending on CSR in Nepal, the regulating, assisting, collaborating and endorsing roles of the government in promoting CSR are not yet fully clear. Against this backdrop, this study attempts to assess the role of government in promoting CSR in Nepal.

## Review of literature

### *Conceptual review on the role of government in promoting CSR*

One of the most significant documents in analysing government roles in promoting CSR is the work of Fox, Ward and Howard (2002). This report classifies government role in CSR along two

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axes. First are four key roles of public sector or the government: mandating, facilitating, partnering and endorsing. The second axis reflects government initiatives under 10 key themes of the CSR agenda: 1) Setting and ensuring compliance with minimum standards; 2) Public policy role of business; 3) Corporate governance; 4) Responsible investment; 5) Philanthropy and community development 6) Stakeholder engagement and representation; 7) Pro-CSR production and consumption; 8) Pro-CSR certification, “beyond compliance” standards, and management systems; 9) Pro-CSR reporting and transparency; and 10) Multilateral processes, guidelines, and conventions.

Steurer (2010, 2015) has identified five policy instruments that governments can employ in promoting CSR. These CSR policy instruments include informational instruments (or ‘sermons’), fiscal-economic instruments (or ‘carrots’), legal instruments (or ‘sticks’), partnering instruments (or ‘ties’), and hybrid instruments (or ‘adhesives’). He further explains that governments employ the five policy instruments in four thematic areas: raise awareness and build capacities for CSR, improve disclosure and transparency, facilitate socially responsible investment (SRI), and lead by example (or ‘walk the talk’). Similarly, Business Partners for Development (2002) have provided five specific recommendations to developing country governments in order to promote CSR in their respective countries. They are: 1) Ensure innovative and adaptable core standards; 2) Guidelines for reporting; 3) Stimulate dialogue on roles and responsibilities of actors; 4) Build internal capacity to participate in partnerships; and 5) Ensure transparency and accountability of business. In a similar vein, Fox et al. (2002) have also suggested five core themes to be focused by developing country governments in order to promote CSR. They are:

- Building awareness of the CSR agenda and its implications;
- Building capacity to shape the CSR agenda;
- Building a stable and transparent environment for pro-CSR investment;
- Engaging the private sector in public policy processes; and
- Frameworks for assessing priorities and developing strategies.

Though the relevance of specific initiatives may vary from country to country, it is clear from the above discussions that mandating, facilitating, partnering, and endorsing are the key roles of the government in promoting CSR. Table 1 provides a bird-eye-view of the key roles of the government across specific themes in promoting CSR.

**Table 1: Key roles of the government in promoting CSR**

Key Roles	Specific Themes			
	Raise awareness and build capacities	Improve disclosure and transparency	Foster SRI (i.e., socially responsible investment)	Leading by example
Mandating or regulating	Make legal provisions that indicate commitment to sustainable development and/or CSR	Enact laws and directives on CSR reporting	Make laws & acts so as to encourage (e.g., energy saving) or prohibit certain investments	Enact laws & acts enabling sustainable public procurement (SPP)
Facilitating or assisting	Disseminate best practices and help building capacities on managing CSR issues	Develop and provide guidelines on CSR reporting	Provide information on socially responsible investment (via. brochures and websites)	Publish reports on social responsibility of government owned businesses
Partnering or collaborating	Create a platform for stakeholder dialogue for raising awareness and building capacities	Promote partnership between CSOs & businesses on CSR auditing & reporting	Create networks & enter into partnerships with private sector on SRI	Enter into multiple stakeholder engagement framework
Endorsing	Provide tax exemption or give due credit to CSR related activities	Provide awards for or publicize best CSR disclosures or reports	Provide tax incentives to socially responsible investors	Develop or endorse pro-CSR standards and systems

*Source: Adapted and extended from Fox et al. (2002) and Steurer (2010)*

### **Empirical review on the role of government in promoting CSR**

Roles played by the governments have been instrumental in promoting CSR around the world. Countries like the UK, Denmark, Norway, Italy, France and Australia have been amongst the pioneers in this regard. The Asian countries including Thailand, Philippines, China, India and Nepal are also gradually moving forward in this direction.

A research conducted in seven different countries – Brazil, Canada, China, Mexico, Peru, Sweden, and the United Kingdom – revealed that national policies targeting CSR are widespread, regardless of the economic standing of the countries. Many countries focus on the competitiveness that can be derived from implementing socially responsible practices (Ascoli & Benzaken, 2009). Following are the major trends found regarding the roles played by the governments of respective countries in promoting CSR:

- Voluntary guidelines or binding standards that guide or require companies to implement socially responsible practices

- National campaigns that raise awareness about CSR issues
- Government funds made available to the private sector for the implementation of CSR programme

However, the comprehensive and coordinated national strategies necessary for effective CSR promotion found to be elusive, with most governments implementing unaligned policies that fail to address CSR in an all-encompassing manner.

The results of a study by Albareda, Lozano, Tencati, Midttun and Perrini (2008) demonstrated that governments of Italy, Norway and the United Kingdom are incorporating a common statement and discourse on CSR, working in partnership with the private and social sectors, and trying to develop a win-win situation between business & society. However, there are some divergences in applying public policies because of their differences in socio-cultural and political contexts.

Another study done in several developed as well as developing countries revealed the fact that only a few national governments have pursued coherent and comprehensive CSR promotion strategies (United Nations Global Compact and Bertelsmann Stiftung, 2010). They found that the majority of the governments have implemented localised and isolated measures only.

India, China and Nepal are also gradually embracing policies & practices to promote CSR in their respective countries. The government of Gujarat, a state in India, has mandated that that 30 percent of profit before tax of the state owned companies should be contributed to the Gujarat Socio-Economic Development Society (Bhave, 2009). Similarly provisions of Companies Act, 2013 mandates extensive CSR policies, spending and disclosure in India (Afsharipour & Rana, 2014). The Chinese government is also making various efforts to promote CSR in China. On a regional level, states like Shenzhen have taken steps to encourage CSR as a way for the state to enhance its competitive advantage (Ascoli & Benzaken, 2009). Recently, Industrial Enterprise Act, 2015 has mandated certain types of enterprises to spend at least 1 percent of their profit in specified CSR activities (Ministry of Law, Justice and Parliamentary Affairs, 2016). In the similar vain, monetary policy for 2016/17 has also mandated BFIs to spend at least 1 percent of their profit in CSR certain type of CSR activities (Nepal Rastra Bank, 2016). However, detailed regulations on CSR spending have not been prepared yet. Besides, there is no clear research evidence regarding the various roles to be played by the government in promoting CSR in Nepal.

## **Research methodology**

### *Population and sampling framework*

The population of the study consists of 201 firms (commercial banks, development banks, finance companies, insurance companies, manufacturing & processing companies, hydropower companies, hotels, trading and other firms) listed on Nepal Stock Exchange (NEPSE). In total, 190 questionnaires were handed over to executives & managers. Of which, 168 questionnaires were duly filled up and returned. Thus, the overall response rate is 88.42 percent. Similarly 20 senior level executives & managers representing different industry were selected for semi-structured interviews. Note that the unit of analysis in this study is organisation represented by one of the senior executives or managers.

## **Data collection method and instrument**

Questionnaire survey as well as semi-structured interview methods were used to collect data on the role of government in promoting CSR in Nepal. Most of the questions in the structured questionnaire were in closed and scaled format whereas there were some open-ended questions in the semi-structured interview guide. The questionnaires were anonymous, and thus there was no

reason to present a biased picture. The questionnaires were designed in English, because the respondents of this study were senior level executives & managers who usually have good command in English and, additionally, some CSR related terminologies are better understandable in English.

## **Validity and reliability**

In order to ensure the validity and reliability of the study several measures have been taken. First, the survey questionnaires were anonymous and they were finalized only after pretesting with actual respondents, experienced academics & experts in the field. Second, the sample size in the questionnaire survey is 168, which is adequate as per the generalized scientific guideline for sample size decisions suggested by Krejcie and Morgan (1970). Third, after collecting data through survey questionnaires and semi-structured interviews, they were edited for accuracy, legibility and consistencies. Additionally, inter-rater reliability was assessed during qualitative data analysis and a high degree of convergence was found. Differences were resolved through discussions among raters.

## **Results**

### *Status of Government's Role in Promoting CSR in Nepal*

The government can play a key role in defining and promoting responsible business behaviour so as to create a win-win situation between business and society. However, the existing status of government's role in promoting CSR in Nepal is not satisfactory. Table 2 portrays the Nepalese executives & managers' assessment regarding the existing status of government's role vis-à-vis regulating, assisting, collaborating and endorsing CSR practices in Nepal.

**Table 2: Existing status of government's role in promoting CSR in Nepal**

<b>Key role areas</b>	<b>Existing status of role performance</b>					<b>Median</b>	<b>Mean</b>	<b>Std. Dev.</b>
	<b>Not at all</b>	<b>Very little</b>	<b>Moderate</b>	<b>Fairly high</b>	<b>Very high</b>			
Regulating	6.0 percent	33.9 percent	45.2 percent	13.7 percent	1.2 percent	3	2.70	.823
Assisting	20.8 percent	50.6 percent	24.4 percent	4.2 percent	-	2	2.12	.780
Collaborating	25.0 percent	52.4 percent	18.5 percent	4.2 percent	-	2	2.02	.777
Endorsing	24.4 percent	54.2 percent	18.5 percent	3.0 percent	-	2	2.00	.742

Table 2 clearly indicates that the endorsing role, which is concerned with supporting & encouraging appropriate CSR practices through tax incentives, specific award schemes, publicity etc. is very low (median=2; mean=2.0) as overwhelming number of respondents (i.e., 78.6 percent) believe that it is below the moderate level. The collaborating role, which is concerned with collaborating with private sector in CSR related seminars, training, standard-setting process, awareness programme, etc. is also poor (median=2; mean=2.02). The existing situation is not satisfactory for assisting role as well, which is concerned with assisting responsible business practices through capacity building, advisory services, technical assistance, etc. Though the regulating role – which is concerned with regulating & controlling business behaviours through appropriate laws, acts, regulations, policies, standards, etc. – is relatively better (median=3; mean=2.70), it is still slightly below the moderate level.

The interview findings also indicated that the existing role of the government in promoting CSR in Nepal is quite inadequate. The interviews not only supported questionnaire findings but also provided additional insights on it. For instance, one large commercial bank has drastically reduced its spending on philanthropic activities during the last two years. When asked about the reason, the respondent said:

CSR is a good thing but I don't believe that government is encouraging us to meet its social goal. When we contribute to charity or social causes, often they (tax officials) question our intention as if the fund is not properly channelised for the real cause; instead of giving tax rebate for maximum possible level. In contrary, if we provide money to government fund (e.g., Prime Minister Natural Disaster Relief Fund), we can't be fully assured whether it is properly utilised.... it is evident from the media news also. Partly, there is a lack of trust between government & business, and partly there is a lack of system & wisdom in government bodies (Deputy CEO, commercial bank – C3).

Similarly, another respondent argued, "Though the government's role on an aggregate is not satisfactory, the role is somewhat good in the banking or financial service sector. In other sectors, there is neither strong regulatory body nor clear policy" (Company Secretary, hydropower company – C17). Interestingly and ironically, one respondent said "there are associations everywhere and often they are using unfair means & lobbying for their own benefits but the government is acting just a spectator without any regulation & control" (CEO, finance company – C8).

All these indicate that the role of government is somewhat satisfactory in banking sector particularly in terms of regulation but the existing state of affairs in other areas is highly inadequate in the Nepalese context.

#### *Assessment of the government's role performance gap*

Literature suggests the different roles to be played by the government in promoting CSR. But, the actual roles played by the government and the need for the specified role may vary across countries. Lesser the gap between existing level of role performance and the desired level of role performance, the situation can be regarded as better. Table 3 shows the gap between the existing level and the needed level of role performance by the government in promoting CSR in Nepal.

**Table 3: Government's role performance gap in promoting CSR in Nepal**

Key role areas	Desired level of role performance						Existing role performance (Mean)	Role performance gap	
	Not necessary	Somewhat necessary	Moderately necessary	Quite necessary	Highly necessary	Median			
Regulating	-	1.8 percent	28.0 percent	51.2 percent	19.0 percent	4	3.88	2.70	1.18
Assisting	0.6 percent	17.3 percent	54.2 percent	24.4 percent	3.6 percent	3	3.13	2.12	1.01
Collaborating	-	11.9 percent	45.8 percent	35.7 percent	6.5 percent	3	3.37	2.02	1.35
Endorsing	-	2.4 percent	23.2 percent	49.4 percent	25.0 percent	4	3.97	2.00	1.97

Table 3 clearly shows that there is a substantial gap between the existing level of role performance and the desired level of roles to be played by the government in promoting CSR in Nepal. Interestingly, respondents indicated that the endorsing role of the government is most essential (median=4; mean=3.97) but it is the least emphasized area (median=2; mean=2.0) in the

Nepalese context. The table also indicates that the other areas requiring additional role performance of the government in the order of importance are: collaborating, regulating and assisting.

## **Suggestions to the government and policy makers for promoting CSR in Nepal**

Though the government can play a vital role in promoting CSR in any country, no governments can afford to ignore the suggestions of the business community in making policies for promoting responsible business behaviour. Table 4 portrays a summary of suggestions provided by the Nepalese executives & managers to the government & policy makers for promoting CSR in Nepal obtained through questionnaire survey.

**Table 4: Suggestions to the government & policy makers for promoting CSR in Nepal**

S.N	Suggestions to the government & policy makers	Frequency count	Percentage of N**	Percentage of n**
1.	Create awareness on CSR such as through CSR day/week, CSR awards, etc.	20	11.9	31.7
2.	Formulate CSR policies, act and regulations in order to ensure that every business behaves responsibly.	22	13.1	34.9
3.	Give tax exemption and other clearly spelled out incentives for certain CSR activities.	37	22.0	58.7
4.	Support and/or subsidize pro-CSR production, operation, and customer service systems.	6	3.6	9.5
5.	Establish a specialized CSR agency by the government to regulate & facilitate CSR related activities.	7	4.2	11.1
6.	Make mandatory provision for CSR unit and CSR budget allocation at least for medium & large sized businesses.	10	6.0	15.9
7.	Make and articulate CSR standards/codes that can be adopted voluntarily by businesses.	8	4.8	12.7
8.	Make mandatory CSR standards separately for different sectors and monitor firms' activities against such standards.	11	6.5	17.5
9.	Define CSR focus areas in line with government's vision and give tax rebate on such areas. And, revise it periodically.	6	3.6	9.5
10.	Foster interaction & partnership among business, (I)NGOs, government & other stakeholders in social issues.	11	6.5	17.5
11.	Lead by example via. good governance and no corruption in regulatory bodies, government agencies & its businesses.	12	7.1	19.0
12.	Establish strong regulatory system in all sectors and reform existing business related acts & regulations, as needed.	9	5.4	14.3

13.	Bring clear CSR policies, priorities and indicators and duly recognize, reward and publicize best performers every year.	12	7.1	19.0
14.	Highlight business case to CSR and encourage firms to integrate CSR in their strategy & day-to-day operations.	5	3.0	7.9

**Notes:**

\*N (total number of respondents in the questionnaire survey)= **168**

\*\*n (total number of respondents for *this particular open-ended question* in the questionnaire survey)= **63**.

Since a respondent can give no/one/more specific suggestions, the total frequency count may be more or less than the total number of respondents in the questionnaire survey.

As shown in the Table 4, most of the executives & managers believe that the government can promote CSR in Nepal by giving tax exemption and other clearly spelled out incentives for certain CSR activities; formulating CSR policies, act and regulations and creating awareness on CSR such through CSR day, CSR awards, etc.; and leading-by-example by government authorities & and its businesses; and bringing clear CSR policies, priorities & indicators and duly recognise, reward & publicise most socially responsible firms every year. Besides, a number of other diverse suggestions were obtained from executives & managers as shown in the Table 4 above.

Semi-structured interviews substantiated the findings of questionnaire survey while at the same time revealed additional insights into the role of government in promoting CSR in Nepal. Most of the respondents mainly focused on the need of providing tax exemption on philanthropic as well as environmental CSR activities. Besides, they also suggested that the government & policy makers should reward and duly recognise socially responsible firms in order to promote CSR in Nepal. Similarly, the respondents also highlighted the need for clear CSR policies, priorities and standards; specialised CSR agency and strong monitoring & control mechanism; and mandatory CSR unit, CSR budget and its reporting.

Interestingly, a respondent from a large insurance company (CEO, insurance company – C13) highlighted the need for a new economic model, within which employees, communities, suppliers, and shareholders are all considered as ‘investors’ with the right to participate in the firm’s governance and to benefit from its surplus. A respondent from small-sized financial institution (CEO, finance company – C8) said that monitoring & promoting business ethics is far more important than asking companies to spend some money on social issues out of the total profit made by them.

Thus, both the questionnaire survey and semi-structured interviews indicate that the Nepalese government has to do a lot in promoting CSR in Nepal. To this end, giving tax exemption in certain areas of CSR activities and clear CSR policy with strong regulatory framework are the most emphasised ones.

## Discussions and conclusion

The role of business in promoting positive social progress is well recognised by governments around the world. At the national level, CSR is regarded as a mechanism to address welfare deficits and a means of promoting national competitiveness (Swift & Zadek, 2002) whereas it is considered as a strategic tool for tackling climate change and environmental sustainability at the international level (European Commission, 2014).

However, findings of this study indicate that the role of government in promoting CSR is still inadequate in Nepal. There is a big gap particularly in endorsing role of the government followed by collaborating, regulating and assisting roles respectively. This is quite contrasting to the research findings by Ascoli & Benzaken (2009) conducted in seven different countries from North America (Canada and Mexico), South America (Brazil & Peru), Europe (Sweden & UK) and Asia (China). The study revealed that governmental roles in CSR are widespread & instrumental regardless of the economic standing of the countries. However, this finding closely resembles with the finding of SAWTEE and ECCA (2010) and Adhikari (2012). Adhikari (2012), for instance, finds that despite the growing awareness of CSR among owners & employees, one of the inhibiting factors for CSR initiatives in Nepal is negligible role of the government.

Regarding the suggestions of executives & managers to the government and policy makers for promoting CSR in Nepal, most of the respondents in questionnaire survey opined that giving tax exemption and other clearly spelled out incentives for certain CSR activities is vitally important. Respondents also emphasised on the need of formulating clear CSR policies, act and regulations in order to ensure that every business behaves responsibly. It is interesting to note that respondents suggested the government not only for endorsing responsible business behaviour but also for regulating & controlling business behaviour in order to check possible misconduct. It is in line with the argument of Steiner and Steiner (2011) that government regulation is essential for two reasons: first, to control flaws in the market and, second, to promote social and political objectives.

It is noteworthy to mention that interview there is a high degree of convergence between questionnaire survey and interview findings. But, some additional insights were revealed during the interviews. In addition to the need for endorsing and regulating roles of the government, interview participants highlighted the need for leading by example by government-owned businesses, controlling undue socio-political pressure, promoting ethical conduct rather than discretionary spending, development & enforcement of new economic model and so on. These findings closely resemble with the suggestions of Steurer (2010) in addition to the fact that Nepalese managers have also urged to control undue socio-political pressure by the government to help companies really focus on genuine social issues.

In a nutshell, the role of government in promoting CSR Nepal is highly inadequate. There is a need for increasing its role particularly with respect to endorsing and collaborating. Thus, giving tax exemption or providing other clearly spelled out incentives for certain CSR activities and collaborating with private sector in various CSR related issues – including research, training, standard-setting process, etc. – are vitally important in order to promote CSR in Nepal. Thus, this study signifies that it is a high time for Nepalese government & policy makers to come up with strong, coherent and comprehensive CSR policy instruments and specific programme in order to protect and promote the interests of business, government, and society at large.

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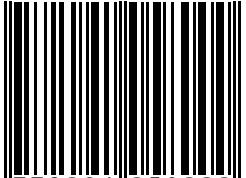
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