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## **DETERMINANTS OF CAPITAL ADEQUACY RATIO (CAR) IN NEPALESE COOPERATIVE SOCIETIES**

### **Abstract:**

Due to a poor capital standard some depository institutions (DIs) failed recently. Therefore, stakeholders such as regulators, managers, researchers, etc. are concerned to fix a precise level of long-term sources of fund in their capital structure. DIs are highly levered firm because major portion of their capital structure consists of debt collected from deposits. Thus, capital adequacy ratio is a significant measure to evaluate efficiency and stability which affects the likelihood of insolvency for those institutions. Nepalese banks are applying Basel framework in order to maintaining a precise level capital standard. But, Nepalese cooperatives such as saving and credit cooperatives, multipurpose cooperatives, etc. are not regulated by the central bank, and thus, are not subjected to follow the Basel. In this regard, we evaluated the determinants of the capital adequacy ratio of Nepalese cooperative societies through descriptive, correlation, and regression analysis using an unbalance panel data of 126 co-operatives from 2009 to 2013. The core determinants of capital adequacy ratio for the Nepalese cooperatives are credit to deposit ratio, net interest margin and types of cooperative in positive direction, whereas assets utilization ratio, size and return on equity in negative direction. Though, the big sized cooperatives have poor strategic capital, the resulted mean and standard deviation suggest cooperatives' capital adequacy ratio is higher but inconsistent than commercial banks.

### **Keywords:**

Capital Adequacy Ratio; Nepalese Cooperative Societies; Financial Ratios; Microfinance Governance and Regulation.

**JEL Classification:** C30, G21

## 1. Introduction

Cooperative concept has ample prospects that can contribute for poverty reduction, mutual growth, financial stability and overall development of an economy. Nepalese cooperative (NC) movement began with the objective of uplifting the socio economic status of the underprivileged rural people. Mainly, poor and illiterate people from rural areas become members in a cooperative society in order to get access to capital market with benefit sharing (Bharadwaj, 2012). A mushrooming growth of cooperative took place after restoration of democracy in 1990. In 1992, new cooperative act was enacted, and democratic government of Nepal adopted liberal economic policy. As a result, 4,555,286 cooperative members are collaborated up to the end of fiscal year 2013/14 in 31,177 cooperative societies (Statistics of Cooperative Enterprises, 2014). Currently, some highly recognized businesses also joined cooperatives, and it becomes a wonderful business model in urban area. Although, performance of enterprising cooperatives has increased due to capital access, risk sharing, and community support, it has also increased caution for unethical issues such as adverse selection problem, lack of transparency, misuse of funds and poor governance system. Therefore, failure of some large and reputable cooperatives has experienced recently (Karki et al., 2013).

Though fundamental framework of cooperative differs from a depository institution (DI) like commercial bank, NCs such as savings and credits (SAC), multipurpose (MPC), etc. are doing fund intermediating business like DIs. The health of a DI is affected by a number of operational risks such as investment risk, solvency risk, liquidity risk, etc. (Anuj, 2011). Moreover, DIs are highly levered firm since those capital structures are represented by major percent of debt collected from deposits. In addition to this, DIs such as commercial bank, development bank, etc. have implemented the Basel II accord since they are subjected to the central bank regulation (HallCalem & LaCour-Little, 2004; Avery & Berger, 1991). This helps to maintain a proper amount of adequate permanent capital to them, and prevents from default risk arises due to credit risk, solvency risk, investment risk and so on. But in case of cooperative societies, Basel provisions are not mandatory to apply which will provide a prominent space for unethical practices inside cooperative. Moreover, the situation may lead to adverse effects such as the depositors losing their money, lose of members' confident in the cooperative system, and may result financial instability (Kithinji, 2010). In this case, the concern should be taken due consideration for protecting what we have now from a probable default of cooperative sectors. Therefore, it is crucial to study the capital adequacy ratio (CAR) of cooperatives, so that, we can seek a strategic strength of cooperative societies.

Recent failure of DI due to mismanagement of capital standards has raised a considerable interest to regulators, managers, researchers, etc., and has induced to maintain a precise level of the strategic capital requirements. CAR is significant measure to evaluate the efficiency and stability in a DI which affects the likelihood of its insolvency (Bateni et al., 2014, p 109). Similarly, a DI should keep CAR above a specific level, so that, it can facilitate financial stability, else it may result risks and bankruptcy (Abusharba et al., 2014). The CAR may differ in banking industry from time to time or from firm to firm. This might be due to various reasons. A wrong financing decision

leads to wrong capital structure resulting high debt ratio, and a wrong investment decision leads to loan default and profit decrement which is the sources of long term capital.

A regulation of capital requirement should be done to ensure that the risk exposures of financial institutions are founded by an adequate amount of worthy capital. The apprehension of a regulator is to guarantee assets quality and fund availability of DIs to meet claims of depositors in liquidation (Abusharba et al., 2014). The government of Nepal has identified cooperative as a pure community organization with strong faith on self- sustaining, democratic and self- governed institutions. Such convictions result a poor supervision, and therefore, the unethical practice of cooperatives has groomed recently (Bharadwaj, 2012). Besides that, operating under Ministry of Cooperatives and Poverty Alleviation, Department of Cooperatives has been regulating the overall functioning of NC societies. Though there are 38 division offices and 6 training centers across the country (DOC, 2014, P.23), increasing cooperatives density, few numbers of division office staff, poor institutional arrangements, lack of standard regulation system, etc. have caused regulations less effective. Though central bank and Basel Committees on Bank Supervision have forwarded a framework to regulate capital bases and credit risk, legal and administrative provisions imposed to the cooperative are not standard as banking regulations. In this regard, cooperative regulations seem to be breakable.

On the one hand, cooperatives are operating in prioritized and marginal sectors, playing a significant role in capital formation and regional development, influencing in economic indicators, etc. if got failure, it may trigger a multiple failures in the economy, and on the other hand lack of permanent capital and risky allocation of total assets increase the probability of bankruptcy, credit default, operational failure of it. Pertaining to those facts, this research work has entirely connected with the research questions such as: What are the core determinants that affect the permanent capital strength of NC societies? To what extent leverage risk (as measured by CAR) has been affected by profitability, efficiency, and organizational factors such as earning distribution pattern, type of cooperative, and size? And, what are the policy implications of those determinants?

We have presented the remainder of the article as: discussing past study relevant to present study in part 2, explaining the methodology in part 3, discussing the results in part 4, and finally, concluding the study report in part 5.

## **2. Review of literature**

A CAR is the rate of primary capital coverage per unit of asset hold by a DI. It is considered that higher the covering rate, the sound financial strength and stability of DI (Al-Tamimi & Obeidat, 2013, P. 44). Bank for International Settlements has forwarded a minimum threshold of 8% CAR for each DI. However, in many cases a DI cannot maintain the required level during the financial and banking services offered by it. This could be harmful at some point in rapidly changing economic and financial services industry (Williams, 2011, P. 223). Likewise, higher capital bases are required for a DIs in order to have crucial public confidence on it. Capital bases are considered as a state of wellbeing for a DI. It represents the prime factor while shaping DIs' perception by depositors and other stakeholders. Moreover, the government has also interest on CAR to maintain

financial stability, allow smooth flow of liquidity, and reduce the likelihood of failure of DI (Aspal & Nazneen, 2014, P. 28).

A financial system can perform significantly better in open market economy by increasing the availability of funds and allowing risk diversification through efficient channeling of funds (Bekaert et al. 2000). An efficient financial system can effectively mobilize and allocate resources leading to strong economic growth (Bhetuwal, 2007). It is also suggested that governments should lead in promoting institutional arrangements for that. In recent years, the agency related issues and the role of intermediating companies are great concern of issues for various reasons such as involving of abusive practices, facilitating corporate abuses, misusing private information, etc. which show an underlying market imperfections in financial systems (Adelman, 1999). Furthermore, Imperfect financial markets make external finance costly and reduce investment. Recent evidence suggests that the collective decision process in the management of major financial firms harms indicative individuals (Walter, 2003). In the vary context, argument supports for a strong need of regulation due to increase in fund intermediaries function done by all types of DI. Mustafa et al. (2011) suggests a solid risk management depends on the legal, regulatory and institutional environment. Accordingly, solving agency issues such as adverse selection problem, frauds, malpractices, etc. the role of government has increased to the intervention of internal managerial affairs to price management of fund intermediating firms (NEF, 2013). But regulators of NC do not have proper authority that they can only suggest against a serious case such as granting Rs 38 million loans without collateral to the board member from total Rs 40 million deposits collected by a particular cooperative (Karki et al., 2013).

A risk can affect DIs profitability and financial health adversely. Thus, Basel II intended to improve safety and the soundness of the financial system by placing increased emphasis on banks own internal control and risk management process and models (Goyal & Agrawal, 2009). Mostly banks and financial institution are applying Basel system for risk management, but the NCs are not. Moreover, World Council of Credit Union (WOCCU) recommends that credit unions should apply Basel system only if government is regulating already based on it. This is because credit unions are not generally supervised. If situation demands, adopting Basel will definably improve the capital base of a credit union. However, former to applying Basel II, the credit unions should be given chance to comment on the new regulatory requirement (WOCCU , 2008). Meanwhile, WOCCU suggests for adopting PEARLS system in credit union than Basel. PEARLS system stands for Protection, Effective Financial Structure, Asset Quality, Rates of Return and Costs, Liquidity, and Signs of Growth. Under this framework, a credit union's financial ratios are taken in account, and benchmarked in presume indicators. CAMELS rating system is also applying to benchmark the performance and health of DIs. The ratings are assigned on a scale from 1 to 5. A DI with rating of 1 or 2 is considered as poor performer, and subjects to a supervisory concern, while DI with rating of 3, 4, or 5 is considered as moderate to the best performer (Lopez, 1999).

A number of empirical studies have suggested the influences of CAR of DIs on financial performances, efficiency and organizational attributes. Gezu (2014) studied 8 Ethiopian commercial banks by taking sample period of 2002 to 2013, and found significant positive causal relationship on Non performing loan to gross loan ratio (NPL) of return on assets (ROA) and tax

rate, but significant negative causal relationship on NPL of CAR, return on equity (ROE) and loan rate. Similarly, Shingjergji & Hyseni (2015) findings also support the negative relationship between NPL and CAR. Moreover, the direction shows by the causation between CAR and liquidity position is inconsistent with Abusharba et al. (2014) and Büyükşalvarcı & Abdioğlu (2011), but consistent with Abusharba et al. (2014) and Bateni et al. (2014) studies. Furthermore, Abusharba et al. (2014) studied 12 Indonesian banks for the sample period 2009 to 2011. The study found there is a significant positive influence of ROA and Liquidity position of bank and, a significant negative influence of assets quality on adequate permanent capital of bank. The relationship between ROA and CAR suggested by Abusharba et al. (2014) study is consistent with the findings of Bateni et al. (2014), Ogboi & Unuafe (2013), Kosmidou et al. (2003), Büyükşalvarcı & Abdioğlu (2011), Al-Tamimi & Obeidat (2013), Aktas et al. (2015), etc. but inconstant with the findings of the Dreca (2013) study. The study done in 24 banks of Turkey for the sample period 2006 to 2010 shows a significant influencing capacity of loan loss provision and equity to deposit ratio on CAR in positive direction, and of ROE in negative direction (Büyükşalvarcı & Abdioğlu, 2011). The finding suggested by Büyükşalvarcı & Abdioğlu (2011) about relationship between ROE and CAR is consistent with finding of Al-Tamimi & Obeidat (2013), Nuviyanti & Anggono (2014), Gezu (2014), etc. studies, but inconsistent with findings of Dreca (2013), Bateni et al. (2014), etc. studies. According to the Nuviyanti & Anggono (2014) study, the CAR is negatively influenced by net interest margin (NIM), but Kosmidou et al. (2003), Aktas et al. (2015), etc. studies suggest a positive relationship between them. The stochastic relationship between CAR and financial performance suggested by past study is not seemed to be uniform. In some cases, the past findings are conflicting to each other, and in other cases findings are supporting to each other. Therefore, for the NC society a null hypothesis can be stated as: Hypothesis I: There is no significant association between CAR and profitability of a cooperative. Again, Aspal & Nazneen (2014) found a positive stochastic variance between CAR and Management efficiency, but Shingjergji & Hyseni (2015) and Odunga et al. (2013) suggested a positive variance between CAR and CD, and CAR and operating efficiency. Based on this contrasting result next hypothesis has been formulated as: Hypothesis II: There is no significant association between CAR and efficiency of a cooperative. Bateni et al. (2014) showed a direct stochastic variance between CAR and liquid ratio, and CAR and equity ratio, but an inverse stochastic variance between CAR and size. Based on these findings next hypothesis is formulated as: Hypothesis III: There is no significant association between CAR and firm specific attributes of a cooperative.

Form preceding survey statement of past study shows that there is a number of studies regarding CAR, regulation, problem, etc. of DIs, but mostly in case of banks and financial institutions those are subject to central bank regulation. It seems that there is a poor availability of such literatures in credit unions and cooperatives enterprises. We belief this study may fill a research gap regarding microfinance regulation.

### 3. Methodology

#### Data and sampling

We used secondary data collected from annual audited financial statement of cooperatives. Kathmandu, being capital city, people from all around the country are living and working here. The demographic and economic heterogeneity gives resonance strata to do sampling. Assuming all Nepal as population for the study, Kathmandu district is selected as sample. Kathmandu has a variety of cooperatives such as small, medium, large, multipurpose (MPC), saving and credit (SAC), women, agricultural, business, trade, etc. MPC and SAC are providing banking services. In this regard, we selected a sample of 126 co-operatives (i.e. 91 SAC and 35 MAC) from 2009 to 2013. The year 2009 represents the Nepalese fiscal year 16th July 2008 to 15th July 2009, and respective years represent in respective way. The list of sampled cooperatives, their types, etc. are presented in the appendix II.

#### Variables

Capital Adequacy Ratio (CAR): The CAR is a measure of a depositor's ability to absorb insolvency losses by calculating the ratio of permanent capital to risk weighted assets. Central bank keeps an eye on the CAR of banks so that bank can be protected from insolvency risk by holding adequate long term capital. But, in cooperative such provision is lacking, and therefore risk weights of cooperatives' assets are not defined. We calculated CAR as total capital other than core deposit to total assets. This can be a proxy for a gross estimation of long term capital strength and credibility of cooperative to protect against risk arises from high degree of financial leverage.

$$CAR = \frac{\text{Total Permanent Capital}}{\text{Risk Weighted Assets}} = \frac{\text{Total Assets} - \text{Core Deposit}}{\text{Total Assets}} \quad \text{--- 1}$$

Net Profit Margin (NPM): The NPM is calculated as after-tax net income to total operating income which includes all interest income earned from earning assets and noninterest income earning from other sources. A higher net profit margin suggests efficient DI to convert operating revenues into actual profit. We calculated NPM as:

$$NPM = \frac{\text{Net Income After Tax}}{\text{Operating Income}} = \frac{\text{Net Income After Tax}}{\text{Interest and NonInterest Income}} \quad \text{--- 2}$$

Net Interest Margin (NIM): NIM is calculated as net interest income (i.e. interest income-interest expenses) to interest earning assets. It is the measure of rate of net interest earned per unit of earning assets. We calculated NIM as:

$$NIM = \frac{\text{Net Interest Income}}{\text{Earning Assets}} = \frac{\text{Interest Income} - \text{Interest Expenses}}{\text{Loan} + \text{Other Investment}} \quad \text{--- 3}$$

Return on Assets (ROA): ROA is the ratio of net income to total assets of a firm. It measures efficiency of the business in using its assets to generate after tax net income. ROA indicates the amount of rupees earned on each rupee of assets. Thus higher value of ROA shows that a business is more profitable (Brealey et al., 2011). We calculated ROA as:

$$ROA = \frac{\text{Net Income After Tax}}{\text{Total Assets}} \quad \text{--- 4}$$

Return on Shareholders' Equity (ROE): ROE measures the ability of a firm to generate net profits per unit of equity capital invested by shareholders in a firm (Brealey et al., 2011; Penman, 2009). We calculated ROE as:

$$ROE = \frac{\text{Net Income After Tax}}{\text{Total Equity}} = \frac{\text{Net Income After Tax}}{\text{Share capital} + \text{Undistributed Profit} + \text{Reserve Fund}} \text{ --- -- 5}$$

Assets Utilization Ratio (AU): AU ratio explains the rupees revenue earned from each rupee of assets owned. An increase in AU means the cooperative is being more efficient (Penman, 2009). We calculated AU as:

$$AU = \frac{\text{Operating Income}}{\text{Total Assets}} \text{ --- -- 6}$$

Credit to Deposit Ratio (CD): Estimated CD shows how efficiently deposit has been utilized by a cooperative. Since deposits are big liabilities of cooperatives, they have to be utilized as far possible. Low degree of CD implies miss utilization of deposit or unproductive investment such as purchase of office buildings, fixed assets, etc. done by a cooperative. We calculated CD as:

$$CD = \frac{\text{Credit}}{\text{Deposit}} \text{ --- -- 7}$$

Dividend Rate (Div.): Div is the rate of rupee dividend per par value of share capital.

Natural Logarithm of Total Assets (lnTA): lnTA is natural logarithm of total assets and used as proxy of size.

Type (D<sub>1</sub>): We have two types of cooperative: MPC or SAC, and represented by dummy variables D<sub>1</sub>. The value of D<sub>1</sub>=1 if type=SAC else 0.

**Method**

Secondary data are analyzed through different data analysis techniques such as descriptive analysis, correlation analysis and regression analysis. We estimated central tendency statistics and dispersion for descriptive analysis. We estimated Pearson correlation and regression statistics to test hypotheses. For regression analysis following functional model has estimated.

$$\text{Leverage Risk} = f[\text{Financial Performance, Efficiency, Organizational Attributes}] \text{ --- -- B}$$

Leverage risk is measured from CAR. The equation B is further categories into three different models for the testing of hypotheses H<sub>1</sub>, H<sub>2</sub>, and H<sub>3</sub>. The following models are analyzed and tested by categorizing equation B into financial performance, efficiency and organizational attributes models.

Financial Performance Model

$$CAR_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 NPM_{it} + \beta_3 NIM_{it} + \beta_4 ROE_{it} + e_i \text{ --- -- B}_1$$

Where, ROE, NPM, NIM and ROA are profitability ratios. The i represents firm identification, t represents the year identification, and e<sub>i</sub> represents the errors term in the equation. While testing of hypothesis I, higher CAR variable implies less risky but also expected to generate low degree of ROE by multiplying ROA by lower equity multiplier (i.e. equity multiplier=total assets/equity). Thus, it is assumed to be positive relationship between CAR and profitability ratios other than ROE.

### Efficiency Model

$$CAR_{it} = \alpha + \beta_1 AU_{it} + \beta_2 CD_{it} + e_i \dots \dots \dots B_2$$

Where, AU and CD are efficiency ratios. While formulating of hypothesis II, the past studies suggested the conflicting relationship between efficiency and leverage variables. The model is therefore defined to seek the influences of efficiency variables on leverage risk of NCs.

### Organizational Attributes Model

$$CAR_{it} = \alpha + \beta_1 Div_{it} + \beta_2 InTA_{it} + \beta_3 D_{1it} + e_i \dots \dots \dots B_3$$

Where, Div, In TA and  $D_1$  are the organizational attribute variables. An increase in dividend rate reduces the permanent capital of cooperative. In order to built the size there must be the higher deposit collection, and thus reduces the permanent capital ratio. An MPC do other business along with banking services. For that, there need to be more capital strength as non-financial firm. To test hypothesis III, it is thus expected to have negative influences of Div, InTA, and  $D_1$  in CAR.

We also did stepwise ordinary least squares (OLS) and generalized least squares (GLS) regression analysis so that true determinates of CAR in NC society can be identified.

The descriptive statistics, correlation coefficients, and regression statistics are calculated by using SPSS 16.0 and StataSE10 applications. Moreover, structuring of tables and tabulation of data are done in Ms-excel 2007.

## 4. Data Analysis

### 4.1 Descriptive Analysis

The descriptive statistics of CAR for each year and for entire sample period are provided in the table 1. The distribution of CAR data is right skewed because the median is less than mean for each year. Drawn statistics of CAR suggest that long term or permanent capital of NC was 24.08 % of total assets. Standard deviation shows an average deviation of CAR was  $\pm 14.78\%$  from the estimated value of mean. Similarly, NCs' maximum and minimum CAR rates were 94.3% and -7.21% respectively for entire sample. The minimum CAR must be 10% for bank and financial institutions of Nepal those are subject to central bank regulation (CAR, 2007). Moreover, average, minimum and maximum CAR rates of Nepalese commercial bank in 2014 were 9.024%, 2.02%, and 13% respectively (NRB, 2014, P.16-17). Though NCs' CAR seems to be greater commercial banks in average, the maximum and minimum scores show that the NCs' CAR was fluctuated more than commercial banks' CAR. NCs are collecting and investing funds from their own members only. In some case, regular deposit from members were considering as permanent source of capital. Due to this reason, the CAR score was seemed to be up to 94.3%. Furthermore, the minimum CAR score of -17.2% suggests a poor level of permanent capital. Moreover, negative pattern of minimum CAR had been improved from 2011. In comparison of the scores between SAC and MPC for entire sample, the SAC had lower CAR and fluctuation than MPC. The mean CAR was highest in 2011 and lowest in 2013, but seemed to be quite consistent during the sampling period.



**Table 1: CAR: Descriptive Statistics**

(This table shows descriptive statistics of CAR of 126 Nepalese cooperative societies for each year and for the entire period pooling cross-sectional and time series data from 2009 to 2013. Data are extracted from audited annual reports of respective cooperatives. SAC=saving and Credit Cooperative, MPC=Multipurpose Cooperatives, Avg=Average, SD=Standard deviation, Max=Maximum, Min=Minimum, and N=No of Observations)

|            | 2009  |       |       | 2010  |       |       | 2011    |       |       |
|------------|-------|-------|-------|-------|-------|-------|---------|-------|-------|
|            | Total | SAC   | MPC   | Total | SAC   | MPC   | Total   | SAC   | MPC   |
| Avg (in %) | 25.46 | 26.24 | 23.39 | 23.62 | 23.69 | 23.46 | 25.64   | 25.72 | 25.45 |
| Md (in %)  | 19.31 | 21.25 | 18.10 | 20.81 | 21.44 | 19.49 | 22.29   | 21.86 | 22.76 |
| SD(in %)   | 18.44 | 16.56 | 22.85 | 14.22 | 14.17 | 14.52 | 14.61   | 15.56 | 11.97 |
| Max(in %)  | 89.05 | 76.99 | 89.05 | 69.80 | 69.80 | 64.88 | 94.3    | 94.3  | 59.95 |
| Min(in %)  | -17.2 | -1.48 | -17.2 | -2.71 | -2.71 | 4.42  | 5.85    | 6.11  | 5.85  |
| N          | 113   | 82    | 31    | 121   | 86    | 35    | 126     | 91    | 35    |
|            | 2012  |       |       | 2013  |       |       | Overall |       |       |
|            | Total | SAC   | MPC   | Total | SAC   | MPC   | Total   | SAC   | MPC   |
| Avg (in %) | 22.91 | 22.17 | 24.82 | 22.89 | 22.16 | 24.80 | 24.08   | 23.9  | 24.41 |
| Md (in %)  | 19.55 | 18.95 | 22.03 | 19.82 | 19.81 | 20.71 | 20.31   | 20.3  | 20.56 |
| SD(in %)   | 12.72 | 12.53 | 13.20 | 13.67 | 12.80 | 15.74 | 14.78   | 14.4  | 15.75 |
| Max(in %)  | 64.14 | 64.14 | 61.52 | 80.78 | 74.55 | 80.78 | 94.38   | 94.3  | 89.05 |
| Min(in %)  | 2.69  | 2.69  | 6.62  | 3.55  | 3.55  | 5.47  | -17.2   | -2.7  | -17.2 |
| N          | 126   | 91    | 35    | 126   | 91    | 35    | 612     | 441   | 171   |

Source: Authors calculation

**Table 2: Descriptive Statistics of Independent Variables**

(This table shows descriptive statistics of independent variables of 126 Nepalese cooperative societies for the entire period from 2009 to 2013, pooling cross-sectional and time series data. Data are extracted from audited annual reports of respective cooperative. Avg=Average, SD=Standard deviation, Max=Maximum, Min=Minimum, SE=Standard error and N=No of Observations)

|             | Mean  | SE of Mean | SD    | Min     | Max    | N   |
|-------------|-------|------------|-------|---------|--------|-----|
| ROA(in%)    | 0.82  | 0.09       | 2.04  | -17.92  | 6.72   | 538 |
| NPM(in%)    | 4.53  | 1.25       | 29.02 | -493.33 | 55.37  | 539 |
| NIM(in%)    | 4.97  | 0.25       | 5.91  | -9.38   | 72.27  | 539 |
| CD(in%)     | 99.27 | 1.00       | 24.68 | 41.30   | 196.27 | 607 |
| AU(in%)     | 13.61 | 0.15       | 3.57  | 1.81    | 42.62  | 539 |
| ROE(in%)    | 5.20  | 0.96       | 22.21 | -315.79 | 166.15 | 539 |
| Div(in%)    | 12.16 | 0.23       | 3.76  | 2.40    | 20.00  | 266 |
| lnTA(in Rs) | 17.75 | 0.06       | 1.41  | 13.50   | 22.06  | 612 |

Source: Authors calculation

The table 2 represents the descriptive statistics of independent variables. The total number of observation should be 630, but we recorded 612 number of lnTA which is maximum observation and 266 number of Div which is minimum observation. The mean score of ROA is 0.82%. The maximum and minimum ROA are 6.72% and -17.92% respectively. The ROA, as suggested by standard deviation, is fluctuated by 2.04%. Though, mean ROE of NC is 5.2%, mean Div is

12.16%, earning distribution rate is 2.43 times (i.e.  $12.16 \div 5.2$ ) greater than actual earning rates. A cooperative firm should distribute dividend to its shareholders after retaining 25% of earnings in reserve fund, and Div should not exceed 15% (Cooperative Department, 2014; Cooperative Act, 1991). But we observed that 4.76%<sup>1</sup> of sampled cooperatives are distributing dividend though they had negative profits. Similarly, 2.28%<sup>2</sup> of sampled cooperatives are distributing 20% dividend to their shareholders.

### 4.2 Correlation Analysis

We used Pearson correlation coefficient to seek a linear relationship between dependent and independent variables. The statistics are presented in table 3. Derivation of financial ratios is helpful to draw a logical association from results. In this case, CAR is as:

$$CAR = \frac{\text{Permanent Sources of Funds}}{\text{Risk Weighted Assets (RWA)}} \text{ --- --- --- --- --- } -1$$

$$\text{Or, CAR} = \frac{\text{Equity} + \text{Long Term Debt}}{\text{RWA}} \text{ --- --- --- --- --- } -1.1$$

$$\text{Or, CAR} = \frac{\text{Total Assets(TA)} - \text{Deposit}}{\text{TA}} \text{ --- --- --- --- --- } -1.2 \text{ \{i.e. proxy of equation 1.1\}}$$

Total assets (TA) > TA – Deposit, and from equation 1.2, TA and Deposit have inverse effect and equity has direct effect on CAR. Thus, correlation statistics between lnTA and CAR presented in table 3 shows a significant negative linear association between them. In addition, it implies that the big sized cooperatives had lower amount of permanent capital in their portfolio.

**Table 3: Pearson Correlation Statistics of Regression Variables**

(This table shows correlation statistics of dependent and independent variables of unbalanced panel data set of 126 Nepalese cooperative societies used in our study for the entire period from 2009 to 2013. Data are extracted from audited annual reports of respective cooperatives. r=Pearson Correlation; \*\* Significant at the 0.01 level (2-tailed); \*Significant at the 0.05 level (2-tailed), and N=No of Observations)

|     |   | <b>ROE</b> | <b>NPM</b> | <b>ROA</b> | <b>NIM</b> | <b>AU</b> | <b>CD</b> | <b>Div</b> | <b>lnTA</b> |
|-----|---|------------|------------|------------|------------|-----------|-----------|------------|-------------|
| CAR | r | -0.092*    | -0.044     | 0.005      | 0.497**    | 0.162**   | 0.699**   | -0.033     | -0.319**    |
|     | N | 538        | 538        | 538        | 539        | 539       | 605       | 265        | 612         |

Source: Authors calculation

Again,

$$ROE = \frac{\text{Net Profit}}{\text{Equity}} \text{ --- --- --- --- --- } -5$$

From equation 5, equity and ROE are inversely related. The relationship between ROE and equity and between CAR and equity seems to be opposite. Hence, estimated -0.092 correlation coefficient shows a poor degree but significant (i.e. at 5%) negative linear relationship between CAR and ROE.

Again,

<sup>1,2</sup> Based on authors calculation using sampled data.

$$\text{NIM} = \frac{\text{Net Interest Income}}{\text{Earning Assets(EA)}} \text{ --- --- --- --- --- } 3$$

$$\text{Or, NIM} = \frac{\text{Interest Income} - \text{Interest Expenses}}{\text{EA}} \text{ --- --- --- --- --- } 3.1$$

$$\text{Or, NIM} = \frac{\text{Interest Income} - \text{Paying Rate} \times \text{Deposit}}{\text{EA}} \text{ --- --- --- --- --- } 3.2$$

The earning assets (EA) is a good proxy of TA. From equation 3.2, the NIM is inversely related with Deposit and TA. Therefore, coefficient shows a significant (i.e. at 1%) positive relationship between NIM and CAR.

Again,

$$\text{AU} = \frac{\text{Operating Income}}{\text{TA}} \text{ --- --- --- --- --- } 6$$

$$\text{CD} = \frac{\text{Credit}}{\text{Deposit}} \text{ --- --- --- --- --- } 7$$

Equation 6 and 7 show inverse relationship between AU and TA, and between CD and Deposit, therefore, correlation statistics 0.162\*\* and 0.699\*\* are estimated between AU and CAR and between CD and CAR respectively.

### 4.3 Regression Analysis

In this section, we presented the results of regression equations estimated in methodology section. We estimated the statistics of each model individually, and finally, we used all independent variables to estimate the four steps OLS and GLS statistics.

**Table 4: Financial Performance Model B<sub>1</sub> Statistics**

(This table shows statistics of regression models B<sub>1</sub> formulated in methodology section above of 126 Nepalese cooperative societies for the unbalanced panel data of entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is dependent variable. R<sup>2</sup>=Coefficient of Determinates; SE=Standard error of estimates; and Sig=Significance level)

| Model                 |          | Un-standardized Coefficients |       | Standardized Coefficients | t      | Sig   |
|-----------------------|----------|------------------------------|-------|---------------------------|--------|-------|
|                       |          | B                            | SE    | Beta                      |        |       |
| B <sub>1</sub>        | Constant | 18.174                       | 0.718 |                           | 25.324 | 0     |
|                       | ROA      | 0.332                        | 0.374 | 0.047                     | 0.886  | 0.376 |
|                       | NPM      | -0.035                       | 0.028 | -0.070                    | -1.237 | 0.217 |
|                       | NIM      | 1.258                        | 0.090 | 0.520                     | 13.928 | 0     |
|                       | ROE      | -0.094                       | 0.029 | -0.144                    | -3.301 | 0.001 |
| <b>Models Summary</b> |          |                              |       |                           |        |       |
| R <sup>2</sup> =0.276 | SE=12.2  | F-score=50.694               |       | Sig of F-score=0.0        |        |       |

Source: Authors calculation

The table 4 represents the statistics and model summary of financial performance model B<sub>1</sub>. The R<sup>2</sup> indicates how much the dependent variable (i.e. CAR) can be explained by the financial performance variables such as ROE, NIM, ROA, and NPM. In this case, combined efforts of regressed variables have explained CAR by 27.6%, and remaining 72.4% (i.e. 1-27.6%) by other

factors. Standard error of model B1 indicates that the average variability of observed value around the fitted line of regression is  $\pm 12.2$ . The F score is 50.694 which is significance at 0 percent. This indicates the rejection of null hypothesis I, i.e. leverage risk of cooperatives is affected by profitability variables of NCs. But, only NIM and ROE are significant enough to predict the CAR, since P values of t scores of ROA and NPM are higher than 0.05. Since earning assets is a part of TA, and equation 3.2 shows that NIM is also inversely related with Deposit and TA like CAR, so supporting the process, CAR is significantly influenced by NIM in positive direction. The result is consistent with Kosmidou et al. (2003), but inconsistent with Nuviyanti & Anggono (2011). At the same time, higher CAR tends to be less leverage effect in capital structure and thus reduces the ROE while deriving it from ROA, thus, CAR is significantly influenced by ROE in negative direction. But if a firm has negative profits the result should be in opposite of that. Our study showed that the negative variance between CAR and ROE. The result is consistent with Büyüksalvarcı & Abdioğlu (2011), Al-Tamimi & Obeidat (2013), Nuviyanti & Anggono (2014), Gezu (2014), etc. studies, but inconsistent with Bateni et al. (2014), and Dreca (2013) study. Though higher CAR reduces the return of firm, a cooperative has to optimize tradeoff between CAR and ROE to maintain strong long term insolvency position of it.

**Table 5: Efficiency Model B<sub>2</sub> Statistics**

(This table shows statistics of regression models B<sub>2</sub> formulated in methodology section above of 126 Nepalese cooperative societies for the unbalanced panel data of entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is dependent variable. R<sup>2</sup>=Coefficient of Determinates; SE=Standard error of estimates; and Sig=Significance level)

| Model                 |          | Un-standardized Coefficients |       | Standardized Coefficients | t      | Sig   |
|-----------------------|----------|------------------------------|-------|---------------------------|--------|-------|
|                       |          | B                            | SE    | Beta                      |        |       |
| B <sub>2</sub>        | Constant | -15.414                      | 2.19  |                           | -7.038 | 0     |
|                       | AU       | 0.013                        | 0.121 | 0.003                     | 0.107  | 0.915 |
|                       | CD       | 0.395                        | 0.017 | 0.715                     | 23.296 | 0     |
| <b>Models Summary</b> |          |                              |       |                           |        |       |
| R <sup>2</sup> =0.513 | SE=9.52  | F-score=278.63               |       | Sig of F-score=0.0        |        |       |

Source: Authors calculation

The table 5 shows the regression statistics and summary of efficiency model B<sub>2</sub>. The R<sup>2</sup> 0.513 suggests the 51.3% rate of combine explaining capacity by AU and CE regressed in the model for predicting CAR, and remaining 48.7 % (i.e.1-0.513) is explained by other variables. Standard error of the estimate of the regression model B<sup>2</sup> is 9.519 indicates average variability of  $\pm 9.519$  from observed value around the fitted line of regression. The F score=278.634, and it is significant at 0 percent indicating hypothesis II is rejected, and suggesting efficiency variables can be explained the CAR significantly. But coefficient of predicting variables shows only coefficient of CD variable is not significantly different from 0 because its t-score is significant 0% and indicates that, overall, the coefficient of CD and constant applied are only significant enough to predict the CAR. Most probably, cooperative having adequate capital can supply more loan in case of less deposit collection too, and moreover, result also suggests cooperatives having higher CD ratio also had permanent capital. The finding is also supported by Odunga et al. (2013) study done in Kenya and Aspal & Nazneen (2014) study done in India, but opposed by Shingjergji and Hyseni (2015) study.

**Table 6: Organizational Attributes Model B<sub>3</sub> Statistics**

(This table shows statistics of regression models B<sub>3</sub> formulated in methodology section above of 126 Nepalese cooperative societies for the unbalanced panel data of entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is dependent variable. R<sup>2</sup>=Coefficient of Determinates; SE=Standard error of estimates; and Sig=Significance level)

| Model                 |                | Un-standardized Coefficients |        | Standardized Coefficients |        |                    |
|-----------------------|----------------|------------------------------|--------|---------------------------|--------|--------------------|
|                       |                | B                            | SE     | Beta                      | t      | Sig                |
| B <sub>3</sub>        | Constant       | 83.105                       | 10.221 |                           | 8.13   | 0                  |
|                       | Div            | -0.055                       | 0.199  | -0.016                    | -0.274 | 0.784              |
|                       | InTA           | -3.355                       | 0.554  | -0.351                    | -6.055 | 0                  |
|                       | D <sub>1</sub> | 2.207                        | 1.614  | 0.079                     | 1.367  | 0.173              |
| <b>Models Summary</b> |                |                              |        |                           |        |                    |
| R <sup>2</sup> =0.129 |                | SE=11.91                     |        | F-score=12.85             |        | Sig of F-score=0.0 |

Source: Authors calculation

The organizational attributes model B<sub>3</sub> statistics and summary are presented in the table 6. The R<sup>2</sup> value indicates how much of the dependent variable, CAR, can be explained by the independent variables such as D<sub>2</sub>, InTA, and Div. In this case, 12.9% can be explained from D<sub>2</sub>, InTA, Div, and remaining 87.9% (i.e.1-12.9%) by other factors. The F score 12.85 is significant at 0% indicating in overall model is significant to predict CAR. This suggests rejection of null hypothesis III. But not all variables used in model, coefficient of constant and InTA are only significant enough for predicting CAR. This suggests managers should see change in leverage risk while increasing the size. It also implies the big sized cooperatives did not have adequate long term capital, and they are in higher degree of solvency risk exposures. The finding is supported by finding of Bateni et al. (2014), Aktas et al. (2015), Aspal & Nazneen (2014) studies, and refused by finding of Shingjergji & Hyseni (2015) study. A big sized cooperative pools the large amount of public fund. Thus, regulatory bodies have to keep eyes on this node to regulate capital structure of the cooperatives for protecting public funds.

The table 7 shows the stepwise regression statistics of OLS and GLS estimates. In a set of panel data, the OLS treats each observation as a unique and new observation, but the GLS considers the time series and cross-sectional identifications while estimating the regression statistics. In the forth step, model has included CD, NIM, D<sub>1</sub>, and AU respectively. Rests of the variables used in study were excluded by models. This suggests the core determinants of CAR for the NC societies are CD ratio, NIM rate, types of cooperative, and AU respectively. For the step first, coefficient of CD shows that an increase in 1% CD ratio of industry leads to an average increase of 0.37% and 0.4% CAR assuming OLS and GLS respectively. In the step second, combined influencing capacity of CD and NIM for predicting CAR is 55.9%. The R<sup>2</sup> values show including more variables in each step, model predicting capacity has also increased. In most of the case, coefficient of GLS estimates t scores are higher than coefficient of OLS estimates t scores. This shows CAR is significant with year and firm specific identifications associating with other predicators in the model. Model and variables used by each step are significant enough to influence dependent variables since their F scores or Chi-square scores are significant at 0%.

**Table 7: Stepwise Regression Statistics**

(This table shows statistics of four-step OLS and GLS estimates of 126 Nepalese cooperative societies for the unbalanced panel data of entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is dependent variable for all models; Variables in leftmost column are included variables in each respective step; Remaining independent variables used in study are excluded. Data are extracted from audited annual reports of respective cooperatives. Con.=Constant predictors; R<sup>2</sup>=Coefficient of Determinates;\*\*\* Significant at the 0%; \*\*Significant at the 1%; and \*Significant at the 5%, figures below predictors coefficient are t scores of respective predictors)

|                          | Step 1    |                   | Step 2   |                   | Step 3    |                   | Step 4   |                   |
|--------------------------|-----------|-------------------|----------|-------------------|-----------|-------------------|----------|-------------------|
|                          | OLS       | GLS               | OLS      | GLS               | OLS       | GLS               | OLS      | GLS               |
| Con.                     | -13.51    | -15.58            | -9.89    | -12.58            | -8.20     | -11.49            | -1.02    | -1.899            |
|                          | -5.76***  | -9.27***          | -4.19*** | -7.68***          | -3.40**   | -6.74***          | -0.27    | -0.78             |
| CD                       | 0.37      | 0.4               | 0.298    | 0.34              | 0.30      | 0.34              | 0.30     | 0.33              |
|                          | 15.53***  | 24.02***          | 11.15*** | 19.59***          | 11.49***  | 19.79***          | 11.51*** | 19.73***          |
| NIM                      | -         | -                 | 0.68     | 0.6               | 0.68      | 0.60              | 0.82     | 0.87              |
|                          |           |                   | 4.84***  | 8.0***            | 4.92***   | 8.15***           | 5.55***  | 10.0***           |
| D <sub>1</sub>           | -         | -                 | -        | -                 | -3.13     | -1.93             | -3.11    | -2.12             |
|                          |           |                   |          |                   | -2.66**   | -2.18*            | -2.69**  | -2.46*            |
| AU                       | -         | -                 | -        | -                 | -         | -                 | -0.56    | -0.73             |
|                          |           |                   |          |                   |           |                   | -2.51*   | -5.47***          |
| F/ <u>X</u> <sup>2</sup> | 241.05*** | <u>577.09</u> *** | 144.1*** | <u>691.64</u> *** | 101.05*** | <u>702.58</u> *** | 79.13*** | <u>771.97</u> *** |
| R <sup>2</sup>           | 0.514     |                   | 0.559    |                   | 0.573     |                   | 0.585    |                   |
| N                        | 605       |                   | 533      |                   | 533       |                   | 533      |                   |

Source: Authors calculation

## 5. Conclusion

The NCs have considerable contribution in prioritized, marginal and regional development. Moreover, sound and efficient operations of them are crucial current issue. The CAR is the indicator of financial strength and stability of DI. We did descriptive, correlation, and regression analysis by using an unbalance panel data of 126 co-operatives from 2009 to 2013 to evaluate the determinants of the CAR. We have explored a number of facts those can be concluded as:

In average, CAR is greater in cooperative societies than commercial banks, but the maximum and the minimum scores show cooperatives' CAR was more inconstant than commercial banks' CAR. The facts from descriptive statistics suggest that some cooperatives have operated against the cooperative laws. This might be arisen due to number of reason such as cooperative members' level of education, unqualified cooperative managers, poor regulations accomplished by government, etc. The relationship between ROE and equity and between CAR and equity seems to be opposite. Hence, higher CAR reduces the equity multiplier, and thus reduces the ROE while deriving it from ROA. Regression and correlation results show the negative variance between CAR and ROE. The findings are steady with Büyükşalvarcı & Abdioğlu (2011), Al-Tamimi & Obeidat (2013), Nuviyanti & Anggono (2014), Gezu (2014), etc. studies, and conflicting with Bateni et al. (2014), and Dreca (2013) study suggesting a cooperative has to optimize tradeoff between CAR and ROE to maintain balance between long term insolvency position and profitability. The NIM can define CAR significantly in positive direction. The relationship is consistent with Kosmidou et al. (2003), but fluctuating with Nuviyanti & Anggono (2011). The findings from efficiency model suggest cooperatives having higher CD ratio also had permanent capital supporting Odunga et al. (2013) study done in Kenya and Aspal & Nazneen (2014) study done in India, but opposing by Shingjergji and Hyseni (2015) study. From the firm attribute model, coefficient of LnTA is significant enough for predicting CAR suggesting managers should watch behavior of leverage risk while increasing the size which is consistent with Bateni et al. (2014), Aktas et al. (2015), Aspal & Nazneen (2014) studies, and inconsistent with Shingjergji & Hyseni (2015) study. Regarding the level of risk on the large amount of public fund collected by big sized, regulatory bodies have to regulate capital structure of the cooperatives promptly for protecting the public funds.

### Appendix I: Reviewed Literature Regression Summary

(DV: Dependent Variables; CB: Commercial Bank; UB: Unbalanced; NPL: Non-performing Loan Ratio; GDP: Gross Domestic Product; LLP: Loan Loss Provision; LR: Liquidity Ratio; BOE: Bank Operating Efficiency; FP: Financial Performance; ME: Management Efficiency; \*\*Significant at 1%, \*Significant at 5%, No \* Significant at 10%; Italic represents negative influence on DV or Chi square instead of F score)

| Study                           | Country     | Sampling                  | D.V. | F-score | R <sup>2</sup> | Significant Independent Variables  |
|---------------------------------|-------------|---------------------------|------|---------|----------------|--|
| Gezu (2014)                     | Ethiopia    | 8 CB (2002-13)            | NPL  | -       | 0.643          | <i>CAR**</i> , <i>ROA**</i> , <i>ROE**</i> , <i>Loan Rate**</i> , <i>Effective Tax Rate*</i>   |
| Aktas et al. (2015)             | East Europe | 71 Banks (2007-12)        | CAR  | 276.6** | -              | <i>Size**</i> , <i>ROA**</i> , <i>Leverage**</i> , <i>NIM**</i> , <i>Bank Risk**</i> , <i>GDP**</i> , <i>Systematic Risk**</i> , <i>Coverage Ratio**</i> , <i>Governance**</i>                 |
| Abusharba et al. (2014)         | Indonesia   | 12Banks(2009-11)          | CAR  | 27.56** | 0.821          | <i>ROA*</i> , <i>Assets Quality**</i> , <i>Liquidity**</i>   |
| Ogboi & Unuafe (2013)           | Nigeria     | 6Banks(2004-09)           | ROA  | 3.52**  | 0.649          | <i>CAR*</i> <i>CD*</i>   |
| Bateni et al. (2014)            | Iran        | 6 Banks(2006–12)          | CAR  | 16.1**  | 0.712          | <i>LR**</i> , <i>ROE**</i> , <i>ROA*</i> , <i>Equity Ratio **</i> , <i>size*</i>   |
| Kosmidou et al. (2003)          | UK          | 32 Banks (UB) (1995-02)   | ROA  | 152.6** | 0.883          | <i>Cost to Income**</i> , <i>LR**</i> , <i>CAR**</i> , <i>LLP**</i> , <i>SIZE**</i>  |
|                                 |             |                           | ROA  | 122.4** | 0.885          | <i>Cost to Income**</i> , <i>LR**</i> , <i>CAR**</i> , <i>LLP**</i> , <i>SIZE**</i> <i>Market to Book**</i> , <i>Inflation**</i> , <i>GDP**</i> , <i>Concentration**</i>                       |
|                                 |             |                           | NIM  | 152.6** | 0.883          | <i>Cost to Income**</i> , <i>LR**</i> , <i>CAR**</i> , <i>LLP**</i> , <i>SIZE**</i>  |
|                                 |             |                           | NIM  | 122.4** | 0.885          | <i>Cost to Income**</i> , <i>LR**</i> , <i>CAR**</i> , <i>LLP**</i> , <i>SIZE**</i> <i>Market to Book**</i> , <i>Inflation**</i> , <i>GDP**</i> , <i>Concentration**</i>                       |
| Shingjergji & Hyseni (2015)     | Albania     | 31 Observations (2007-15) | CAR  | 16.21** | 0.672          | <i>NPL**</i> , <i>CD**</i> , <i>Equity multiplier.*</i> , <i>Size*</i>   |
| Büyüksalvarcı & Abdioğlu (2011) | Turkey      | 24 banks (2006 -10)       | CAR  | 17.33** | 0.864          | <i>ROE*</i> , <i>Equity to Deposit*</i> , <i>Liquid Assets</i> , <i>LLP</i> , <i>ROA*</i>  |
| Odunga et al. (2013)            | Kenya       | 40 CB(2005-11)            | BOE  | 1429.3* | 0.084          | <i>CAR*</i> , <i>LR**</i>  |
| Kassali et al. (2013)           | Nigeria     | 30 Cooperatives (2007)    | FP   | 4.87**  | 0.517          | <i>Interest rate</i> , <i>No of loan beneficiaries**</i> , <i>Age of Cooperatives*</i> , <i>No of training*</i> , <i>No of Auditors**</i> , <i>Amount Invested*</i> , <i>No of Employees**</i> |
| Nuviyanti & Anggono (2014)      | Indonesia   | 19 CB (2008-13)           | CAR  | 47.1**  | 0.83           | <i>NIM</i> , <i>NPL**</i> , <i>LR**</i> , <i>ROA**</i> , <i>ROE**</i> , <i>Expn. to Incom.**</i>   |
| Al-Tamimi & Obeidat (2013)      | Jordan      | 12CB (2000-08)            | CAR  | 22.4**  | 0.61           | <i>LR**</i> , <i>Interest Rate*</i> , <i>ROE**</i> , <i>ROA**</i>  |
| Bokhari & Ali (2013)            | Pakistan    | 12 CB (2005-09)           | CAR  | 3.23**  | 0.282          | <i>Portfolio Risk*</i> , <i>Share on deposit*</i>  |
| Aspal & Nazneen (2014)          | India       | CB (2008-12)              | CAR  | 29.6**  | 0.914          | <i>Loan*</i> , <i>Mgmt. Efficiency*</i> , <i>Liquidity***</i> , <i>Sensitivity***</i>  |
| Dreca (2013)                    | Bosnia      | 10CB(2005-10)             | CAR  | 2.81    | 0.945          | <i>Deposit**</i> , <i>Loan to Assets*</i> , <i>ROA*</i> , <i>ROE**</i> , <i>Leverage*</i>  |
| Williams (2011)                 | Nigeria     | Industry avg. (1980-2008) | CAR  | 21.33** | 0.75           | <i>Exchange rate**</i> , <i>Money supply**</i>   |
|                                 |             |                           | CAR  | 10.16*  | 0.88           | <i>Exchange rate**</i> , <i>Money supply**</i> , <i>LR**</i> ,   |
|                                 |             |                           | CAR  | 10.09*  | 0.92           | <i>Exchange rate**</i> , <i>Money supply**</i> , <i>LR**</i> , <i>Domestic Interest Rate**</i> , <i>Trade to GDP**</i> , <i>Demand deposit**</i> , <i>Total Loan*</i>                          |



**Appendix II: List of Cooperative Societies under Study**

(Note: Up to serial number 91 represents SAC and other represents MPC)

| S.N. | Name of Cooperative    | Address       | S.N. | Name of Cooperative        | Address             |
|------|------------------------|---------------|------|----------------------------|---------------------|
| 1    | Dhaulagiri SAC         | Sundhara      | 64   | Ashok Vinayak SAC          | Ason                |
| 2    | Apasi sahayog SAC      | Baluatar      | 65   | Subarnapuri SAC            | Yangal, Chhetrapati |
| 3    | Eco Himal SAC          | Thamel        | 66   | Param SAC                  | Bangemudha          |
| 4    | Shree Sai SAC          | Ason          | 67   | Jhee Pasa SAC              | Jamal               |
| 5    | Navajyoti mahila SAC   | Chabhil       | 68   | Panash SAC                 | Mahabouddha         |
| 6    | Pragati Mahila SAC     | Balaju chowk  | 69   | Aju Dha SAC                | Basantapur          |
| 7    | Maygdi SAC             | Gongabu       | 70   | Maa Santoshi SAC           | Mitranagar          |
| 8    | Kaligandaki SAC        | Gongabu       | 71   | Mahila Jagaran SAC         | Danchhi             |
| 9    | Sadabahar SAC          | Sabalbahal    | 72   | Kunfen SAC                 | Boudha              |
| 10   | Namoharati SAC         | Kalimati      | 73   | Mahila Prayash SAC         | Dhumbarahi          |
| 11   | Safal SAC              | Babarmahal    | 74   | Nawa shrjanshil SAC        | Chabhil             |
| 12   | Spandan SAC            | Tinthana      | 75   | Shreedridhi SAC            | Sankhamul           |
| 13   | Shree Ganesh SAC       | Samakhusi     | 76   | Jageda SAC                 | Tinthana            |
| 14   | Janapriya SAC          | Gongabu       | 77   | Shital SAC                 | kalimati            |
| 15   | Active SAC             | Banasthali    | 78   | Shubha Bihani SAC          | Chabhil             |
| 16   | Komaletaswor SAC       | Thali, Danchi | 79   | Doordarshan SAC            | Dillibazar          |
| 17   | Shubha Deepawali SAC   | Koteshwor     | 80   | Munal SAC                  | Gongabu             |
| 18   | Raliable SAC           | Baneshwor     | 81   | Mahabouddha SAC            | Newroad             |
| 19   | Chandragiri SAC        | Thankot       | 82   | saral Sathi SAC            | Pyukha              |
| 20   | Gopi krishna SAC       | Newroad       | 83   | Sam SAC                    | Bhotahity, Sajha    |
| 21   | Annapurna SAC          | Mahabouddha   | 84   | Sweat Bhairab SAC          | Jhonchhe            |
| 22   | National SAC           | Maharajung    | 85   | Peace SAC                  | Wotu                |
| 23   | CIVIL SAC              | Soaltimode    | 86   | Jebils Cooperative Ltd.    | Ranamukteshwar      |
| 24   | shree Harati Maa SAC   | Dharmapath    | 87   | Nawa Shristi SAC           | Manamaiju-8         |
| 25   | Jaya Ashok Vinayak SAC | Basantapur    | 88   | Dharmasthali SAC           | Dharmasthali        |
| 26   | Bouddha SAC            | Nardevi       | 89   | Subarna Bhumi SAC          | Ichangunarayan      |
| 27   | Capita SAC             | Chhetrapati   | 90   | Bijesworimata SAC          | Bijeswori           |
| 28   | Ujyalo SAC             | Chabhil       | 91   | Lekali SAC                 | Thamel              |
| 29   | Ankur SAC              | Dhumbarahi    | 92   | Manabinayak MPC            | Wotu                |
| 30   | Sankata SAC            | Newroad       | 93   | Navabishal MPC             | Ason                |
| 31   | Bright SAC             | Bagbazar      | 94   | Jyoti MPC                  | Jorpati             |
| 32   | Rajdhani SAC           | Bagbazar      | 95   | Namuna Mahila MPC          | Chalnakhel          |
| 33   | Astalaxmi SAC          | Dillibazar    | 96   | Sitapaila MPC              | Sitapaila           |
| 34   | Gandaki SAC            | Nayabazar     | 97   | Ours MPC                   | Gongabu             |
| 35   | Nava Yojana SAC        | Balaju chowk  | 98   | Dhaulashree MPC            | Gongabu             |
| 36   | Comfort SAC            | Nayabazar     | 99   | China trade MPC            | Mahabouddha         |
| 37   | Trikash SAC            | Nayabazar     | 100  | Mt. Dhaulagiri MPC         | Balaju              |
| 38   | Laligurans SAC         | Nayabazar     | 101  | Namaste Nepal MPC          | Chabhil             |
| 39   | Nabaratra SAC          | Gongabu       | 102  | Kirtipur MPC               | Kirtipur            |
| 40   | Naba Dhaulagiri SAC    | Gongabu       | 103  | Himalayan MPC              | Basundhara          |
| 41   | Tinthana SAC           | Tinthana      | 104  | Chamati MPC                | Chamati             |
| 42   | Community SAC          | Kalimati      | 105  | Nepal Merchant MPC         | Mahabouddha         |
| 43   | Aakash SAC             | Putalisadak   | 106  | Royal MPC                  | Basundhara          |
| 44   | Aphanta SACCO          | Minbhawan     | 107  | Mahaguthi MPC              | Chhetrapati         |
| 45   | Kantipur SAC           | Minbhawan     | 108  | Milan MPC                  | Newroad             |
| 46   | Reliance SAC           | Dhapasi       | 109  | Manmai ju Samaj kalyan Cop | Manmai ju           |
| 47   | Mahila sahayogi SAC    | Balaju chowk  | 110  | Mahila Uthhan Samaj Coop   | Tinthana            |
| 48   | Sarbakalyan SAC        | Balaju chauki | 111  | Gurdians Coop              | Naxal               |
| 49   | Lunar SAC              | Gongabu       | 112  | Namobouddha MPC            | Basundhara          |
| 50   | Subhabana SAC          | Maharajgunj   | 113  | Dhapasi MPC                | Maharajgunj         |
| 51   | Siddhiganesh SAC       | Yatkha        | 114  | SAARC MPCs                 | kalimati            |
| 52   | Maitidevi Mata SAC     | Maitidevi     | 115  | Lagani MPC                 | Gongabu             |
| 53   | Nepal Sahakari Bittiya | Old Baneshwor | 116  | Sagun Cooperative Ltd.     | Chhetrapati         |
| 54   | Brihaspati SAC         | Samakhusi     | 117  | Samjhana MPC               | Kamalaxi            |
| 55   | Sarbochha Bikash SAC   | Chabhil       | 118  | Astamangal MPC             | Jamal               |
| 56   | Dhumbaraha SAC         | Sukedhara     | 119  | New Development MPC        | Newroad             |
| 57   | Subidga SAC            | Mahabouddha   | 120  | Purba Karmachari MPC       | Newroad             |
| 58   | Mahabaglamukhi SAC     | Dhalke        | 121  | Janaudhar Coop             | Basantapur          |
| 59   | Pioneer SAC            | Newroad       | 122  | National CS                | Mahabouddha         |
| 60   | Samudiyak SAC          | Newroad       | 123  | Upahar MPC                 | Sukedhara           |
| 61   | Unity SAC              | Newroad       | 124  | Women CS                   | Kuleshwar           |
| 62   | Rajat SAC              | Khichapokhari | 125  | Ajima Coop Ltd.            | Jorpati-2           |
| 63   | Pooji Bikash SAC       | Newroad       | 126  | Jaya Manakamana MC         | Dharmapath          |

## References

- Abusharba, M. T., I. Triyuwono, M. Ismail, and A. F. Rahman. 2014. "Determinants of Capital Adequacy Ratio (CAR) in Indonesian Islamic Commercial Banks". *Global Review of Accounting and Finance*, Vol. 4. No. 1. March. Pp. 159 – 170.
- Adelman, I. 1999. "The Role of Government in Economic Development. California Agricultural Experiment Station Giannini Foundation of Agricultural Economics". *Working Paper No. 890*.
- Aktas, R., S. Acikalin, B. Bakin, and G. Celik. 2015. "The Determinants of Banks' Capital Adequacy Ratio: Some Evidence from South Eastern European Countries". *Journal of Economics and Behavioral Studies*. Vol. 7, No. 1, pp. 79-88.
- Al-Tamimi, K. A. M., and S.F. Obeidat. 2013. "Determinants of Capital Adequacy in Commercial Banks of Jordan an Empirical Study". *International Journal of Academic Research in Economics and Management Sciences*. July 2013, Vol. 2, No. 4 ISSN: 2222-6990.
- Anuj, A. 2011. "Risk Management: Trends and Opportunities; the Current State of Credit Risk Management". *Capgemini Financial Services*, 6400 Shafer Court, Rosemont, Illinois 60018
- Aspal, P. K., and A. Nazneen. 2014. "An Empirical Analysis of Capital Adequacy in the Indian Private Sector Banks". *American Journal of Research Communication*. 2(11): 28- 42
- Avery, R. B. and A. Berger. 1991. "Risk-based Capital and Deposit Insurance Reform". *Journal of Banking and Finance*. Vol. 15(4/5), pp. 847-874.
- Barker, D., and D. Holdsworth. 1993. "The Causes of Bank Failures in the 1980s". *Research Paper No. 9325*, Federal Reserve Bank of New York.
- Batani, L., H. Vakilifard, and F. Asghari. 2014. "The Influential Factors on Capital Adequacy Ratio in Iranian Banks". *International Journal of Economics and Finance*. Vol. 6, No. 11.
- Bekaert, G., C. Harvey, R. Campbel, and C. Lundblad. 2000. "Emerging Equity Markets and Economic Development". *NBER Working Paper No 7363*.
- Bharadwaj, B. 2012. "Roles of Cooperatives in Poverty Reduction: A Case of Nepal". *Administration and Management Review*. Vol. 24, No. 1, January, 2012, Page 120-139
- Bhetuwal, K. R. 2007. "Financial Liberalization and Financial Development in Nepal". *NRB Economic Review*. Vol. 19, Pp. 23-41.
- Brealey, R. A., C. M. Stewart, and A. Franklin. 2011. "Principles of Corporate Finance". *Tenth Edition McGraw-Hill/Irwin*. Chap. 28, Pp. 704 - 724.
- Büyüksalvarcı, A., and H. Abdioğlu. 2011. "Determinants of Capital Adequacy Ratio in Turkish Banks: A Panel Data Analysis". *African Journal of Business Management*. Vol.5 (27), pp. 11199-11209.
- HallCalem, P. S., and M. Lacour-Little. (2004). "Risk-based Capital Requirements for Mortgage Loans". *Journal of Banking and Finance*. 28(3), pp. 647-672.
- CAR, 2007. "Capital Adequacy Framework". *Nepal Rastra Bank*. Accord Implementation Group.
- Cole, R.A., and J.W. Gunther. 1998. "Predicting Bank Failures: A Comparison of On- and Off-Site Monitoring Systems". *Journal of Financial Services Research*. 13, pp. 103-117.
- Cucinelli, D. 2013. "The Determinants of Bank Liquidity Risk within the Context of Euro Area". *Interdisciplinary Journal of Research in Business*. Vol. 2, Issue. 10, pp.51-64.
- DOC, 2014,. "Annual Progress Report (in Nepali)". *Department of Cooperatives*. New Baneswor, Kathmandu. 2071.
- Dreca, N. 2013. "Determinants of Capital Adequacy Ratio in Selected Bosnian Banks." *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi EYİ 2013 Özel Sayısı* 149.

- Gezu, G. 2014. "Determinants of Non-performing Loans: Empirical Study in Case of Commercial Banks in Ethiopia". *Unpublished Master Thesis*. Jimma University, Business and Economics College, Department of Accounting and Finance.
- Goyal, K. A., and S. Agrawal. 2010. "Risk Management in Indian Banks: Some Emerging Issues". *Int. Eco. J.Res.*, 2010 1(1) 102-109.
- Hirtle, B.J., and J.A. Lopez. 1999. "Supervisory Information and the Frequency of Bank Examinations". *Federal Reserve Bank of New York Economic Policy Review*. 5, pp. 1-20.
- Karki, G. B., S. R. Upreti, and S. R. Mathema. 2013. "Progress Report". *Investigation Commission of Distress cooperatives doing saving and credit transaction, 2070*.
- Kithinji, A. M. 2010. "Credit Risk Management and Profitability of Commercial Banks in Kenya". *Unpublished Master Thesis*. School of Business, University of Nairobi-Kenya. Pp. 1-42.
- Kosmidou, K., S. Tanna, and F. Pasiouras. 2003. "Determinants of Profitability of Domestic UK Commercial Banks: Panel Evidence from the Period 1995-2002".
- Mehara, Y. S. 2009. "Operational Risk Management System and Strategies in Indian Banks". *An Unpublished PhD Thesis*. Delhi University, India.
- Mustafa M. R., M. A. Ali, M. Awaideh, and C. Miller. 2011. "Study on Risk Management in Rural and Agricultural Finance in the Near East and North Africa (NENA) Region". Near East-North Africa Rural and Agricultural Credit Association (NENARACA), FAO of the UN, Rome.
- NEF, 2013. "NEFSSEARCH, A Special Report in Financial Fraud in Nepal, Financial Frauds- Mitigating Risks", Nepal Economic Forum (NEF).
- NRB, 2014. "Banking and Financial Statistics Mid-July, 2014 Np. 60". Nepal Rastra Bank. Bank and Financial Institution Regulation Department. Statistics Division.
- Nuviyanti & Anggono, A. H. 2014. "Determinants of Capital Adequacy Ratio (CAR) in 19 Commercial Banks". *Journal of Business and Management*. Vol . 3, No.7, 2014: 752-764
- Odunga, R.M, P.M. Nyangweso, and D. K. Nkobe. 2013. "Liquidity, Capital Adequacy and Operating Efficiency of Commercial Banks in Kenya". *Research Journal of Finance and Accounting* Vol.4, No.8.
- Ogboi, C., and O. K. Unuafé. 2013. "Impact of Credit Risk Management and Capital Adequacy on the Financial Performance of Commercial Banks in Nigeria". *Journal of Emerging Issues in Economics, Finance and Banking*. Vol.2 No.3 703-717.
- Ongore, V.O., and G. B. Kusa. 2013. "Determinants of Financial Performance of Commercial Banks in Kenya". *International Journal of Economics and Financial Issues* Vol. 3, No. 1, pp.237-252.
- Penman, S. 2009. *Financial Statement Analysis & Security Valuation*, 4th ed. New York: McGraw-Hill/Irwin.
- Shingjergji, A., and M. Hyseni. 2015. "The Determinants of the Capital Adequacy Ratio in The Albanian Banking System During 2007 – 2014". *International Journal of Economics, Commerce and Management*, Vol. III, Issue 1, 1-10.
- Shingjergji, A. 2013. "The Impact of Bank Specific Variables on the Non Performing Loans Ratio in the Albanian Banking System". *Research Journal of Finance and Accounting*, Vol.4, No.7.
- Statistics of Cooperative Enterprises, 2014. Government of Nepal, Ministry of Cooperatives and Poverty Alleviation. Department of Cooperative.
- Walter, I. 2003. "Conflicts of Interest and Market Discipline Among Financial Services Firms. New York University". *Conference Paper*. Federal Reserve of Chicago - Bank for International Settlements conference on "Market Discipline: Evidence Across Countries and Industries. 30 - November 1, 2003.
- WOCCU, 2008. "Technical Guide Credit Union Regulation and Supervision". International Credit Union Regulators' Network.