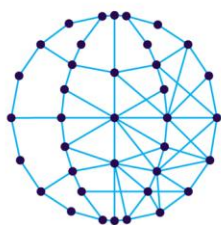


Cooperatives : The Power to Act

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

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Abstract

The failure of depository institutions (DI) resulting from poor capital standards has created a keen interest in regulators, managers, researchers, etc. to maintain a precise level of strategic capital requirements. DIs are highly levered firms due to the presence of a large portion of debt collected through deposit in their capital structure. Thus, the capital adequacy ratio (CAR) is a significant measure of efficiency and stability, which affects the likelihood of insolvency in depository institutions. We carried out descriptive, correlation, and regression analyses using an unbalanced panel data of 126 cooperatives from 2009 to 2013 to evaluate the determinants of the CAR of Nepalese Cooperative (NC) Societies. The mean and standard deviation of NCs' CAR was higher than Nepalese commercial banks. Moreover, the core determinants of CAR for the NCs are credit to deposit ratio, net interest margin rate, and types of cooperative in positive direction. The assets of these determinants were utilization size and the return on equity in a negative direction. The NC managers were distributing higher dividends than earnings, suggesting they are hiding the truth about these facts.

Keywords: capital adequacy ratio (CAR); Nepalese Cooperative Societies; financial ratios; microfinance governance and regulation.

Résumé

La défaillance des institutions dépositaires (DI) résultant de normes de capitalisation déficientes a suscité un fort intérêt des régulateurs, gestionnaires, chercheurs, etc. pour le maintien d'un niveau précis d'exigences en matière de capital stratégique. Les DI sont des sociétés fortement endettées en raison d'une importante part de dettes cumulées via les dépôts dans la structure de capitalisation. Ainsi, le ratio d'adéquation des fonds propres (RAFP, ou CAR dans l'article) est une mesure significative de l'efficacité et de la stabilité, lesquelles influencent la probabilité d'insolvabilité dans les institutions dépositaires. Nous avons conduit des analyses descriptives, de corrélation et de régression à l'aide d'un ensemble de données de 126 coopératives depuis 2009 jusqu'en 2016 afin d'évaluer les facteurs déterminants de l'RAFP pour les sociétés coopératives népalaises (NC). L'écart moyen et l'écart-type de l'RAFP des coopératives népalaises se sont avérés plus élevés que ceux des banques commerciales népalaises. De plus, les principaux facteurs déterminants de l'RAFP pour les coopératives népalaises sont le ratio crédit-dépôt, le taux de marge nette sur les intérêts et les types de coopératives en direction positive. Les actifs de ces facteurs déterminants sont le volume d'utilisation et les rendements sur les capitaux propres dans une direction négative. Les gestionnaires de coopératives népalaises distribuaient plus de dividendes qu'ils ne versaient de bénéfices, ce qui indique qu'ils auraient peut-être camouflé la vérité sur ces faits.

Resumen

El fracaso de las instituciones depositarias (ID) que resulta de normas de capital deficientes ha creado un gran interés en los reguladores, gerentes e investigadores, entre otros, por mantener un nivel preciso de requerimientos de capital estratégico. Las ID son firmas con altos niveles de endeudamiento debido a la presencia de una gran proporción de deuda acumulada a través del depósito en su estructura de capital. Por lo tanto, el coeficiente de solvencia (CAR, por sus siglas en inglés) representa una medida significativa de eficiencia y estabilidad, que afecta la probabilidad de

insolvencia en las instituciones depositarias. Realizamos análisis descriptivos, de correlación y de regresión mediante un panel de datos deficitario de 126 cooperativas desde 2009 hasta 2013 para evaluar los determinantes del CAR de las empresas cooperativas de Nepal (en adelante, NC). La media y la desviación estándar del CAR de las NC fueron más elevadas que las de los bancos comerciales nepaleses. Además, los factores determinantes centrales del CAR para las NC son el índice de crédito respecto de los depósitos, la tasa de margen de interés neto y los tipos de cooperativa en una dirección positiva. Los activos de estos factores determinantes fueron el volumen de utilización y el retorno del patrimonio en una dirección negativa. Los gerentes de las NC distribuían dividendos más elevados que las ganancias, lo que sugiere que ocultan la verdad acerca de estos hechos.

Introduction

Cooperative concepts have ample prospects of contributing to poverty reduction, mutual growth, financial stability, and the overall development of an economy. Nepalese cooperative 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, and thereafter, they obtained access to capital markets with benefit sharing (Bharadwaj, 2012). Mushrooming growth of cooperatives took place after the restoration of democracy in 1990. In 1992, a new cooperative act was enacted and the democratic government of Nepal adopted liberal economic policies. At the end of fiscal year 2013/14, there were 4,555,286 members who collaborated in 31,177 cooperatives (Statistics of Cooperative Enterprises, 2014). Currently, some highly recognized businesses have also joined cooperatives, which have become a wonderful business model in urban areas. 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 problems, a lack of transparency, the misuse of funds, and poor governance systems. Therefore, some large, reputable cooperatives have recently failed (Karki et al., 2013).

Though the fundamental framework of cooperatives is different from pure depository institutions like commercial banks, Nepalese cooperatives such as savings and credits (SAC), multipurpose (MPC), etc. are doing intermediate fund business as depository institutions. The health of depository institutions is affected by a number of operational risks such as investment risk, solvency risk, liquidity risk, etc. (Anuj, 2011). Depository institutions are highly levered firms due to the presence of a large portion of debt from deposits in their capital structure. Banks and financial institutions, subject to central bank regulations, have implemented the Basel II accord (Calem and LaCour-Little, 2004; Avery and Berger, 1991). This helps to maintain a proper amount of adequate permanent capital in depository institutions, and prevents firm defaults occurring due to credit risk, solvency risk, investment risk, etc. However, in the case of cooperatives, such provisions do not apply, which creates a prominent space for unethical practices that may lead to adverse effects, such as the depositors losing their money and a loss of confidence in the cooperative system, and may result in financial instability (Kithinji, 2010). In this case, our concern must be in protecting what we have now from a probable default of cooperative sectors that may lead to a large-scale failure or an economic recession. Therefore, it is crucial to investigate the capital adequacy ratio (CAR) of cooperatives in order to develop cooperative societies with long-lasting strength. Recent failure of depository institutions due to mismanagement of capital standards has sparked the interest of regulators, managers, researchers, etc. to maintain a precise level of the

strategic capital requirements. CAR is significant measured to evaluate the efficiency and stability in depository institutions that affects the likelihood of their insolvency (Bateni et al., 2014: 109). Depository institutions should keep their capital adequacy ratio (CAR) at a specific level so that it can facilitate financial stability, otherwise, it may result in risks and bankruptcy (Abusharba et al., 2014). The CAR may vary in this industry depending on the time and the firm. This could be due to various reasons. A wrong financing decision leads to the wrong capital structure and high debt ratio; a wrong investment decision leads to loan default and profit decrement, which is the source 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 the asset quality and fund availability of depository institutions to meet the claims of depositors in liquidation (Abusharba et al., 2014). The government of Nepal has identified the cooperative as a pure community organization with strong faith in self-sustaining and democratically self-governed institutions. Such a strong conviction in cooperatives has resulted in poor supervision, and therefore, unethical practices have increased recently (Bharadwaj, 2012). Besides that, operating under the Ministry of Cooperatives and Poverty Alleviation, the Department of Cooperatives has regulated the overall functioning of Nepalese cooperative societies. Though there are 38 division offices and 6 training centers across the country (Department of Cooperatives, 2014: 23). Increasing cooperative density, low numbers of division office staff, poor institutional arrangements, the lack of a standard regulation system, and other points have caused regulations to be less effective. Due to the significance of CAR, Basel committees on bank supervision have forwarded internationally recognized capital regulations and credit risk measurements standards. Moreover, legal and administrative provisions imposed on the cooperative are not standardized like the banking regulations enforced by the central bank and Basel II, and thus 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 they failed, it may trigger multiple failures in the economy, and on the other hand, a lack of permanent capital and risky allocation of total assets might increase the probability of bankruptcy, credit default, and operational failure. Pertaining to those cases, this research work is entirely connected with the following research questions: What are the core determinants that affect the permanent capital strength of Nepalese cooperative societies? To what extent has leverage risk (as measured by CAR) been affected by profitability, efficiency, and organizational factors such as earning distribution patterns, the type of cooperative, and size? And, what are the policy implications of those determinants?

The remainder of the paper will discuss past studies relevant to our present study in part 2, the methodology in part 3, the results in part 4, and finally, the conclusion in part 5.

Review of literature

CAR (capital adequacy ratio) is the rate of primary capital coverage per unit of asset held by a depository institution (DI). It is considered that the higher the covering rate, the more sound the financial strength and stability of DI (Al-Tamimi and Obeidat, 2013: 44). The Bank for International Settlements has implemented a minimum threshold of 8% CAR for each DI. However, in many cases a DI cannot maintain the required level during the vigor of financial and banking services offered by it.

This could be harmful at some point in the rapidly changing economic and financial service industry (Williams, 2011: 223). Higher capital bases are required for DIs so that the public has confidence in them. Capital bases are considered a state of health for a DI. They represent the prime factor while shaping the perception of Dis by depositors and other stakeholders. Governments are interested in the CAR to maintain financial stability, allow for a smooth flow of liquidity, and reduce the likelihood of failure of DIs (Aspal and Nazneen, 2014: 28).

A financial system can perform significantly better in an open market economy by increasing the availability of funds and allowing risk diversification through the efficient channeling of funds (Bekaert et al., 2000). An efficient financial system can effectively mobilize and allocate resources, which leads to strong economic growth (Bhetuwal, 2007). It is also suggested that governments must take the lead in promoting the institutional development of the institutions. In recent years, the agency-related issues and the role of intermediating companies has been of great concern for various reasons such as abusive practices, corporate abuse, and the misuse of private information, etc. This shows underlying market imperfections in financial systems (Adelman, 1999). Imperfect financial markets make external finance costly and reduce investment. Recent evidence suggests that the collective decision-making process in the management of major financial firms harms indicative individuals (Walter, 2003). In this context, the argument supports a strong need for regulation due to an increase in the function of fund intermediaries by all types of DIs. Mustafa et al. (2011) suggest that solid risk management depends upon the legal, regulatory and institutional environment. However, the regulatory bodies of Nepalese cooperatives have low authority power and can only make suggestions for serious cases such as granting Rs 38 million loans to board member without collateral from a total of Rs 40 million in deposits collected (Karki et al., 2013). Despite the presence of strong regulatory mechanisms, the supervision and monitoring by regulatory bodies is minimal. The capacity of the Nepalese regulators to supervise is curtailed by lack of professionalism and inadequate human resources. In order to solve agency issues such as adverse selection problems, fraud, and malpractice inside those firms, the role of government has been increased to interventions ranging from internal managerial affairs to price management of cost of intermediating firms (Nepal Economic Forum, 2013).

Risk can adversely affect DIs' profitability and financial health. Thus, Basel II intended to improve safety and the soundness of the financial system by placing an increased emphasis on banks' internal control and risk management process and models (Goyal and Agrawal, 2009). Most banks and financial institutions apply the Basel system for risk management, but the Nepalese cooperatives do not. Moreover, the World Council of Credit Union (WOCCU) recommends that credit unions should apply the Basel system unless the government regulations are already based on it, as credit unions are not generally supervised. If the situation demands it, adopting the Basel system will definably improve the capital base of a credit union. However, before applying Basel II, the credit unions should comment on the new regulatory requirement (World Council of Credit Unions, 2008). Meanwhile, the World Council of Credit Unions (WOCCU) suggests to adopt the PEARLS system in credit unions rather than the Basel system. The PEARLS system stands for Protection, Effective Financial Structure, Asset Quality, Rates of Return and Costs, Liquidity, and Signs of Growth. Under this structure, credit unions' financial ratios are taken in account and benchmarked in presume indicators. The CAMELS rating system is also applied to benchmark the performance and health of DIs. The ratings are assigned on a scale from 1 to 5. Banks with ratings of 1 or 2 are considered poor and subject to a supervisory concern, while banks with ratings of 3, 4, or 5 present moderate to extreme degrees (Lopez, 1999).

A number of empirical studies have suggested that the CAR of depository institutions influences the financial performance, efficiency and organizational factors. Gezu (2014) studied Ethiopian 8 commercial banks from 2002 to 2013 and found a significant positive casual relationship of NPL to ROA, tax rate but a significant negative casual relationship of NPL to the CAR, ROE and loan rate. Shingjergji and Hyseni's (2015) findings also support the negative relationship between NPL and the CAR. The direction showed by the causation between CAR and the liquidity position is inconsistent between Abusharba et al. (2014) and Büyükşalvarcı and Abdioğlu (2011), but consistent between Abusharba et al. (2014) and Bateni et al. (2014). Abusharba et al. (2014) studied 12 Indonesian banks for the sample period, from 2009 to 2011. The study found there is a significant positive influence of ROA and the liquidity position of banks in addition to a significant negative influence of the quality of assets on the adequate permanent capital of banks. The relationship between ROA and CAR suggested by Abusharba et al. (2014) is consistent with the findings of Bateni et al. (2014), Ogboi and Unuafé (2013), Kosmidou et al. (2003), Büyükşalvarcı and Abdioğlu (2011), Al-Tamimi and Obeidat (2013), and Aktas et al. (2015), but inconsistent with the findings of Dreca (2013). The study, which examined 24 Turkish banks for the sample period, 2006 to 2010, shows that LLP and equity have a significant capacity to influence the deposit ratio on CAR in a positive direction and of ROE in a negative direction (Büyükşalvarcı and Abdioğlu, 2011). The findings suggested by Büyükşalvarcı and Abdioğlu (2011) about relationship between ROE and the CAR is consistent with findings of Al-Tamimi and Obeidat (2013), Nuviyanti and Anggono (2014), and Gezu (2014), but inconsistent with findings of Dreca (2013), Bateni et al. (2014). According to the Nuviyanti and Anggono (2014), the CAR is negatively influenced by NIM, but Kosmidou et al. (2003) and Aktas et al. (2015) suggest a positive relationship between them. The stochastic relationship between the CAR and financial performance suggested by the past study is not uniform. In some cases, these findings conflict with each other, and in other cases they support each other. Therefore, for the Nepalese cooperative society, a null hypothesis can be stated as: Hypothesis I: There is no significant association between the CAR and the profitability of a cooperative. Aspal and Nazneen (2014) found a positive stochastic variance between CAR and management efficiency, but Shingjergji and Hyseni (2015) and Odunga et al. (2013) suggested a positive variance between the CAR and CD, and the CAR and operating efficiency. Based on these contrasting results, the next hypothesis has been formulated as: Hypothesis II: There is no significant association between the CAR and the efficiency of a cooperative. Bateni et al. (2014) showed a direct stochastic variance between the CAR and liquid ratio, and CAR and equity ratio, but an inverse stochastic variance between the CAR and size. Based on these findings, our third hypothesis is: Hypothesis III: There is no significant association between CAR and the specific attributes of a cooperative.

Methodology

Data

We used secondary data collected from cooperatives' annual audited financial statements. Kathmandu, the capital city and our sampling strata, has a variety of cooperatives such as small, medium, large, multipurpose (MPC), savings and credit (SAC), women's, agricultural, business, trade, etc. MPC and SAC provide banking services. In this regard, an unbalanced sample of 126 cooperatives (91 SAC and 35 MAC) over the period of 2009 to 2013 were selected for purpose of this study. Year 2009 represents

the Nepalese fiscal year starting on July 16, 2008 to July 15, 2009, with the other years being represented accordingly.

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. The central bank keeps an eye on the CAR of banks so that they are protected from insolvency risk by holding adequate long-term capital. However, in cooperatives this provision does not exist, and therefore, the risks of cooperatives' assets are not defined. In our case, the CAR is calculated as total capital rather than core deposits to total assets. This will give a gross estimation of the long-term capital strength and credibility of cooperatives and their ability to protect themselves against the risks that arise from high degrees of financial leverage.

$$CAR = \frac{\text{Total Permanent Capital}}{\text{Risk Weighted Assets}} = \frac{\text{Total Assets} - \text{Core Deposit}}{\text{Total Assets}} \quad \text{---A1}$$

Net Profit Margin (NPM): The NPM is calculated as after-tax net income divided by total operating income which includes all interest income earned from earning assets and noninterest income earned from different sources. It shows the amount of each rupee of operating income from different sources left over after all expenses have been paid. A higher net profit margin means that a cooperative is more efficient for converting operating revenues into actual profit. In equation form it can be shown as:

$$NPM = \frac{\text{Net Income After Tax}}{\text{Operating Income}} = \frac{\text{Net Income After Tax}}{\text{Interest and Non Interest Income}} \quad \text{---A2}$$

Net Interest Margin (NIM): The 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 earnings per unit of earning assets. It can be written as:

$$NIM = \frac{\text{Net Interest Income}}{\text{Earning Assets}} = \frac{\text{Interest Income} - \text{Interest Expenses}}{\text{Loan + Other Investment}} \quad \text{---A3}$$

Return on Assets (ROA): The ROA is the ratio of net income to total assets of a firm. It measures a business's efficiency in using its assets to generate after-net income. The ROA indicates the amount of rupees earned on each rupee of assets. Thus higher values of return on assets show that business is more profitable (Brealey et al., 2011). It can be estimated as:

$$ROA = \frac{\text{Net Income After Tax}}{\text{Total Assets}} \quad \text{---A4}$$

Return on Shareholders' Equity (ROE): The ROE measures the ability of a firm to generate profits from its shareholders' investments. In other words, the return on equity ratio shows how much profit each rupee of shareholders' equity generates (Brealey et al., 2011; Penman, 2009). It is measured as:

$$ROE = \frac{\text{Net Income After Tax}}{\text{Total Equity}} = \frac{\text{Net Income After Tax}}{\text{Share capital + Undistributed Profit + Reserve Fund}} \quad \text{---A5}$$

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

$$AU = \frac{\text{Operating Income}}{\text{Total Assets}} \text{ --- --- --- --- --- } A6$$

Credit to Deposit Ratio (CD): The CD calculates how efficiently a deposit has been utilized by a cooperative. Since deposits are liabilities of cooperatives they have to utilize them as much as possible. The CD ratio measures the efficiency and risk. A low CD implies misuse of deposits or unproductive investments such as the purchase of office buildings, fixed assets, etc. made by a cooperative.

$$CD = \frac{\text{Credit}}{\text{Deposit}} \text{ --- --- --- --- --- } A7$$

Dividend Rate (Div.): The Div is the rate of rupee dividends on par value of share capital.

Natural Logarithm of Total Assets (lnTA): The lnTA is the natural logarithm of total assets and measure the size of cooperatives.

Types: MPC or SAC represented by dummy variables D1 i.e. D1=1 if SAC otherwise 0.

Method

Secondary data are analyzed through different data analysis techniques such as: descriptive analysis, correlation analysis, and regression analysis. The detail of data analysis procedures and models applied are given below. Descriptive analysis is done by estimating central tendency statistics and dispersion. The study has estimated Pearson correlation and regression statistics to test the hypotheses above. For regression analysis the functional model has estimated.

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

Leverage risk is measured from CAR. Equation A is further categorized into three different models A1, A2, and A3 to test the hypotheses H1, H2, and H3. The following models are analyzed and tested by categorizing equation A into the financial performance, efficiency, and organizational factors of cooperatives.

Financial Performance Model

$$CAR = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + e_i \text{ --- --- --- --- --- } B1$$

Where, ROE, NPM, NIM and ROA are profitability ratios. In hypothesis testing, higher CAR variable are less risky but also expected to generate a lower degree of ROE by multiplying ROA by a lower equity multiplier (i.e. equity multiplier = total assets/equity). Thus, it is assumed that there is a positive relationship between the CAR and profitability ratio.

Efficiency Model

$$CAR = \alpha + \beta_1 AU + \beta_2 CD + e_i \text{ } B2$$

Where, AU and CD are efficiency ratios. The relation is defined to seek the efficiency influences on the risk level of cooperatives.

Organizational Attributes Model

$$CAR = \alpha + \beta_1 \text{Div} + \beta_2 \text{InTA} + \beta_3 \text{D1} + e_i \dots\dots\dots B3$$

Where Div, In TA and D1 are the organizational factor variables. An increase in dividend rates reduces the permanent capital of cooperatives. In order to increase the size there must be a higher deposit collection, and thus the permanent capital ratio is reduced. MPCs do other business along with banking services. For that, there needs to be more capital strength than non-financial firms. Thus, Div, InTA, and D1 are expected to have a negative influence on CAR.

Finally, we did four level stepwise ordinary least squares (OLS) and Generalized (GLS) least squares regression models so that the actual determinates of CAR in Nepalese cooperative society could be identified by regressing all the independent variables used in the study. Descriptive statistics, correlation coefficients, and regression statistics are calculated by using SPSS 16.0 and Stata SE10 computer applications. The structuring of tables and tabulation of data were done in Ms-excel 2007.

Data Analysis

Descriptive Analysis

The descriptive statistics of CAR for each year and for the whole period are given in Table 1. The distribution is right skewed since the median is less than the mean in each year of the total, SAC, and MPC. Drawn statistics of CAR suggest that average cooperatives' long-term or permanent capital was 24.08 % of their total assets. Standard deviation shows the average CAR of the cooperative was deviated by $\pm 14.78\%$ from the estimated mean. The maximum and minimum CAR rates were 94.38% and -7.21%, respectively. The minimum CAR must be 10% for banks and financial institutions of Nepal that are subject to central bank regulations (CAR (2007)). Average, minimum, and maximum CAR rates of Nepalese commercial banks in 2014 were 9.024%, 2.02%, and 13%, respectively (NRB, 2014: 16-17). Though the average CAR is greater in cooperative societies than commercial banks, the maximum and minimum scores that the show cooperatives' CAR fluctuated more than commercial banks' CAR. Nepalese Cooperatives are collecting and investing funds from their own members only. In some case, regular deposits from members were considered a permanent source of capital. Due to this reason, the CAR score seemed to be 89%. However, the minimum CAR of -17.2% suggests a very poor level of permanent capital. Moreover, the negative pattern of minimum CAR has improved since 2011. Comparing the scores between SAC and MPC for the entire sample, the SAC had lower CAR and fluctuation than MPC. The mean CAR was the highest in 2011 and the lowest in 2013, but seemed to be consistent during the sampling period.

Table 1: CAR:Descriptive Statistics

(This table shows descriptive statistics of the 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 the audited annual reports of the 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	94.38	94.38	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

Descriptive statistics of independent variables used in the study are presented in Table 2. Among the 630 observed, the maximum number of 612 ROA variables and the minimum number of 266 Div variables were recorded during the data collection. The mean score of the ROA was 0.82%. The maximum and minimum ROA were 6.72% and -17.92% respectively. In average, the ROA, as suggested by standard deviation, fluctuated by 2.04%. However, the mean ROE of Nepalese cooperatives was 5.2% and the mean Div was 12.16%. In average, the earning distribution rate was 2.43 times (i.e. $12.16 \div 5.2$) greater than actual earning rates. Generally, cooperative firms should distribute earnings as dividends to their shareholders after retaining 25% of the earnings in a reserve fund. Dividend rates should not exceed 15% (Cooperative Department, 2014; Cooperative Act, 1991). If dividend rates (Div) are greater than earning rates (ROE), it is against the cooperative directives, but some of the cooperatives are distributing a greater Div than ROE to make their shareholders happy so that they could increase their job tenure. In this particular situation, we did a different between mean test (i.e. student t test) among ROE and Div variables. The result showed that the average and standard deviation of difference between the ROE and Div (i.e. ROE-Div) were -4.0936% and 11.64% respectively. The t score of the test was -5.357 which was significant at 0%. The findings suggest that if cooperatives were capable enough to pay dividends, cooperative managers were publishing incorrect financial figures and hiding actual profit to save on taxes. If this was not the case, they were misusing their members' deposits. This suggests another form of agency conflict in Nepalese cooperative societies. Such conflict might arise due to a number of reasons such as the cooperative members' level

of education, unqualified cooperative managers, the political instability of the nation, poor government regulations, etc.

Table2: Descriptive Statistics of Independent Variables

(This table shows the descriptive statistics of independent variables of the 126 Nepalese cooperative societies used in our study for the entire period pooling cross-sectional and time series data from 2009 to 2013. Data are extracted from the audited annual reports of the respective cooperatives. 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	0.00	20.00	266
InTA(in Rs)	17.75	0.06	1.41	13.50	22.06	612

Correlation Analysis

We used Pearson correlation analysis to seek a linear relationship between dependent and independent variables; the estimated statistics are presented in Table 3. Further derivation of financial ratio variables has helped to draw a logical reason from the estimated results. Moreover, CAR can be written as:

$$CAR = \frac{\text{Permanent Sources of Funds}}{\text{Risk Weighted Assets (RWA)}} \text{ --- A1}$$

$$\text{Or, CAR} = \frac{\text{Equity} + \text{Long Term Debt}}{\text{RWA}} \text{ --- A1.1}$$

$$\text{Or, CAR} = \frac{\text{Total Assets (TA)} - \text{Deposit}}{\text{TA}} \{\text{proxy of equation B1.1 used in study}\} \text{ --- A1.2}$$

Total assets (TA) > TA – Deposit, and from equations A1.1 and A1.2, the TA and the Deposit have inverse effects and the equity has a direct effect on the CAR. Thus, the correlation statistics between InTA and CAR presented in Table 3 show a significant negative linear association between them. This implies that larger cooperatives had a shortage of total permanent capital in their portfolio.

Again,

$$ROE = \frac{\text{Net Profit}}{\text{Equity}} \text{ --- A5}$$

From equation A5 it can be seen that 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 statistics shows a poor degree of a significant (5%) negative linear relationship between the CAR and ROE.

Table 3: Pearson Correlation Statistics of Regression Variables

(This table shows correlation statistics of dependent and independent variables of an unbalanced panel data set of the 126 Nepalese cooperative societies used in our study for the entire period from 2009 to 2013. Data are extracted from the audited annual reports of the 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)

		ROE	NPM	ROA	NIM	AU	CD	Div	lnTA
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

Again,

$$NIM = \frac{\text{Net Interest Income}}{\text{Earning Assets (EA)}} \text{ --- --- --- --- --- A3}$$

Or,
$$NIM = \frac{\text{Interest Income} - \text{Interest Expenses}}{EA} \text{ --- --- --- --- --- A3.1}$$

Or,
$$NIM = \frac{\text{Interest Income} - \text{Paying Rate} \times \text{Deposit}}{EA} \text{ --- --- --- --- --- A3.2}$$

The earning assets (EA) can be a good proxy of TA. From equation A3.2 it can be seen that the NIM is also inversely related to Deposit and TA. Therefore, our study showed a significant (1%) positive relationship between NIM and CAR.

Again,

$$AU = \frac{\text{Operating Income}}{TA} \text{ --- --- --- --- --- A6}$$

$$CD = \frac{\text{Credit}}{\text{Deposit}} \text{ --- --- --- --- --- A7}$$

It can be seen from equation A6 and A7 that there is an inverse relationship between the AU and TA, and between the CD and Deposit. Thus, the correlation statistics output 0.162** and 0.699** respectively are estimated between them.

Regression Analysis

The result of regression equations estimated in the methodology section are presented in this section. The population regression line parameters have been estimated for each formulated model in the first part. In the second part, all the independent variables used in the three models are regressed for stepwise OLS and GLS estimations.

Table 4: Financial Performance Model B1 Statistics

(This table shows the statistics of the B1 regression models formulated in the methodology section above of the 126 Nepalese cooperative societies for the unbalanced panel data during the entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is a dependent variable. R2=Coefficient of Determinates; SE=Standard error of estimates; and Sig=Significance level)

		Un-standardized Coefficients		Standardized Coefficients		
Model		B	SE	Beta	t	Sig
B1	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
Models Summary						
R2=0.276		SE=12.2		F-score=50.694		Sig of F-score=0.0

Table 4 represents the financial performance regression model B1 statistics and summary. The R2 value indicates how much of the dependent variable, CAR, can be explained by the independent variables of financial performance such as the ROE, NIM, ROA, and NPM. In this case, combined efforts of regressed financial variables have explained the CAR by 27.6%, and the remaining 72.4% (1-27.6%) by other factors. The standard error of the estimate of regression model B1 have indicated an average variability of ± 12.2 from observed value around the fitted line of regression. The model F score is 50.694, and it is significance at 0%. This indicates the rejection result of hypothesis I, i.e. the profitability of cooperatives is affected by leverage risk. However, only the NIM and ROE variables are significant enough for determining the CAR.

Since earning assets is a part of TA, and equation A3.2 shows that the NIM is also inversely related with Deposit and TA like CAR, so supporting the process, CAR is significantly influenced by the NIM in a positive direction. The result is consistent with Kosmidou et al. (2003), but inconsistent with Nuviyanti and Anggono (2011). At the same time, higher CARs tends to have less leverage effect in capital structure and thus reduce the ROE while deriving it from ROA. Therefore, the CAR is significantly influenced by the ROE in a negative direction. However, if a firm has negative profits the result should be in opposite of that. Our study showed the negative variance between CAR and ROE. The result is consistent with Büyüksalvarcı and Abdioğlu (2011), Al-Tamimi and Obeidat (2013), Nuviyanti and Anggono (2014), and Gezu (2014), but inconsistent with Bateni et al. (2014), and Dreca (2013). Although a higher CAR reduces the returns of a firm, a cooperative has to optimize tradeoff between the CAR and ROE to maintain a strong, long-term position of insolvency.

Table 5: Efficiency Model B2 Statistics

(This table shows the statistics of the B2 regression models formulated in the methodology section above of the 126 Nepalese cooperative societies for the unbalanced panel data during the entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is a dependent variable. R²=Coefficient of Determinates; SE=Standard error of estimates; and Sig=Significance level)

		Un-standardized Coefficients		Standardized Coefficients		
Model		B	SE	Beta	t	Sig
B2	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
Models Summary						
R ² =0.513		SE=9.52		F-score=278.63		Sig of F-score=0.0

Table 5 shows the regression statistics and summary of efficiency model B2. The R² 0.513 suggests the 51.3% rate of combined explanation capacity by the AU and CE regressed in the model for predicting the CAR, while the remaining 48.7 % (1-0.513) is explained by other variables. The standard error of the estimate of the B2 regression model is 9.519 and indicates an average variability of ± 9.519 from the observed value around the fitted line of regression. The F score=278.634 and it is significant at 0%, indicating that hypothesis II is rejected and suggesting that efficiency variables can explain the CAR significantly. However, the coefficient of predicting variables only shows that the CD variable coefficient is not significantly different from 0 because its t-score is significant 0%, which indicates that, overall, the coefficient of CD and constant applied are only significant enough to predict the CAR. Most probably, cooperatives with adequate capital can supply more loans with less deposit collection, and moreover, our results also suggest that cooperatives with higher CD ratios also had permanent capital. The finding is also supported by Odunga et al.'s (2013) study done in Kenya and Aspal and Nazneen's (2014) study done in India, but opposed by Shingjergji and Hyseni (2015).

Table 6: Organizational Attributes Model B3 Statistics

(This table shows the statistics of B3 regression models formulated in the methodology section above of the 126 Nepalese cooperative societies for the unbalanced panel data during the entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is a dependent variable. R²=Coefficient of Determinates; SE=Standard error of estimates; and Sig=Significance level)

		Un-standardized Coefficients		Standardized Coefficients		
Model		B	SE	Beta	t	Sig
B3	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
	D1	2.207	1.614	0.079	1.367	0.173

Models Summary			
R2=0.129	SE=11.91	F-score=12.85	Sig of F-score=0.0

The organizational attributes model B3 statistics and summary are presented in Table 6. The R2 value indicates how much of the dependent variable, CAR, can be explained by the independent variables such as D2, InTA, and Div. In this case, 12.9% can be explained by D2, InTA, Div, and the remaining 87.9% (1-12.9%), by other factors. The F score of 12.85 is significant at 0%, indicating that the overall model is significant to predicting the CAR. This suggests arejection of hypothesis III. However, not all variables used in the model, coefficient of constant and InTA were significant enough for predicting CAR. This suggests managers should look to change their leverage risk while increasing their size. It also implies that large cooperatives did not have adequate long-term capital and have a higher degree of solvency risk exposure. This finding is supported Bateni et al. (2014), Aktas et al. (2015), and Aspal and Nazneen (2014), and refuted by Shingjergji and Hyseni (2015). Large cooperatives pool large amounts of public funds. Thus, regulatory bodies have to keep eyes on this node to regulate the capital structure of the cooperatives for protecting public funds.

Table 7: Stepwise Regression Statistics

(This table shows the statistics of the four-step OLS and GLS estimates of the 126 Nepalese cooperative societies for the unbalanced panel data during the entire period pooling cross-sectional and time series data from 2009 to 2013. CAR is a dependent variable for all models; Variables in the leftmost column include variables in each respective step; The remaining independent variables used in study are excluded. Data are extracted from the audited annual reports of the respective cooperatives. Con.=Constant predictors; R2=Coefficient of Determinates; *** Significant at the 0%; **Significant at the 1%; and *Significant at the 5%)

	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***
D1	-	-	-	-	-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/X2	241.05***	577.09***	144.1***	691.64***	101.05***	702.58***	79.13***	771.97***
R2	0.514		0.559		0.573		0.585	
N	605		533		533		533	

Table 7 shows the stepwise regression statistics of OLS and GLS estimates. The OLS treats each observation like a unique and new observation of panel data, but the GLS considers the time series and

cross-sectional identifications while estimating the regression statistics. In the fourth step, the model included the CD, NIM, D1, and AU respectively. The remaining variables used in study were excluded by the models. This suggests that the core determinants of the CAR for Nepalese cooperative societies are the CD ratio, NIM rate, type of cooperative, and AU, respectively. For the step first, the coefficient of CD shows that an increase of 1% CD ratio in the industry leads to an average increase of 0.37% and 0.4% CAR assuming OLS and GLS, respectively. In the step second, the combined influencing capacity of CD and NIM for predicting the CAR is 55.9%. The R² values show more variables in each step and the model predicting capacity has also increased. In most cases, the GLS coefficient estimates t scores are higher than the OLS coefficient estimates t scores. This shows that the CAR is significant in terms of year and firm-specific identifications associating with other predictors in the model. The models and variables used in each step are significant enough to influence the dependent variables since their F scores or Chi-square scores are significant at 0%.

Conclusion

Nepalese cooperatives have a considerable contribution in prioritized, marginal and regional development. Moreover, the sound and efficient operation of them is a crucial current issue. The CAR is the indicator of financial strength and stability of DIs. We have carried out descriptive, correlation, and regression analyses by using an unbalance panel data of 126 cooperatives from 2009 to 2013 to evaluate the determinants of the CAR. We have explored a number of facts, which can be concluded as follows:

In average, the CAR is greater in cooperative societies than commercial banks, but the maximum and the minimum scores show that cooperatives' CAR was more inconstant than commercial banks' CAR. Differences in the mean test among ROE and Div results show that, against the cooperative directives, the cooperative managers are distributing a 4.0936% higher dividend rate than the ROE to make equity holders happy so that they could increase their job tenure. The findings suggest that either managers were hiding actual profit to save on taxes or they were misusing members' deposits. The discovery strongly recommends solving the probable agency conflicts by increasing members' awareness of cooperative education, prompt government regulation, the number of qualified cooperative managers, etc.

The relationship between the ROE and equity and between the CAR and equity seems to be opposite. Hence, a higher CAR reduces the equity multiplier, and thus reduces the ROE while deriving it from the ROA. Regression and correlation results show the negative variance between the CAR and ROE. The findings are in line with Büyükşalvarcı and Abdioğlu (2011), Al-Tamimi and Obeidat (2013), Nuviyanti and Anggono (2014), and Gezu (2014), and conflict with those of Bateni et al. (2014), and Dreca (2013). This suggests that a cooperative has to optimize the tradeoff between CAR and ROE to maintain balance between a long-term insolvency position and profitability. The NIM can define the CAR significantly in a positive direction. The relationship is consistent with Kosmidou et al. (2003), but fluctuates with the findings of Nuviyanti and Anggono (2011). The findings from the efficiency model suggest that cooperatives with higher CD ratios also had permanent capital, supporting Odunga et al.'s (2013) study done in Kenya and Aspal and Nazneen's (2014) study done in India, but opposing Shingjergji and Hyseni (2015). From the firm attribute model, the InTA coefficient is significant enough to predict the CAR, suggesting that managers should watch leverage risk while increasing their

size. This finding is consistent with Bateni et al. (2014), Aktas et al. (2015), and Aspal and Nazneen (2014) but inconsistent with Shingjergji and Hyseni (2015). Regarding the level of risk on the large amount of public fund collected by large cooperatives, regulatory bodies have to regulate cooperative capital structure promptly in order to protect public funds.

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Appendix I

Reviewed Literature Regression Summary

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

(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)

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