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Nexus between Capital Structure and Financial Performance of Nepalese Hydropower Companies

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ABSTRACT

This study aims to shed light on the empirical investigation of the nexus between capital structure and financial performance. This paper focuses on hydropower companies listed on Nepal Stock Exchange (NEPSE) until mid-July 2020. This paper analyzes the nexus of capital structure with the financial performance of hydropower companies for the period 2005/06 to 2019/20. This study applies a descriptive and causal research design. Return on equity (ROE) is used to measure financial performance and is considered a dependent variable and short-term debt to capital (SDC), long-term debt to capital (LDC), total debt to capital (TDC), and debt to assets (DR) ratios are the measures of capital structure and used as explanatory variables. This paper reveals that short-term debt to capital ratio has a positive role in financial performance. Moreover, the findings of this paper depict that long-term debt to capital and total debt to capital has a significant positive impact on the financial performance of hydropower companies in Nepal. However, the debt to asset ratio inversely affects financial performance. Thus, this paper concludes that Nepalese hydropower companies should increase short-term, long-term, and total debt to capital ratios and decrease debt to assets to maximize financial performance. The implication of this study is in the formulation of optimal capital structure policy. The hydropower sector can apply the findings of this paper to formulate an appropriate capital structure policy to maximize its financial performance in Nepal.

1. INTRODUCTION

The financial performance of a corporation is affected by several financial management decisions. Among them, the capital structure decision is an important one. Capital structure is the mix of a firm's permanent long-term financing represented by debt, preferred stock, and common stock equity (Van Horne & Wachowicz, 2009). Thus, the capital structure decision is related to the choice of composition of sources of long-term financing. In other words, capital structure is the decision of the combination of equity, debt, and hybrid securities.

Various capital structure theories have been developed to verify the nexus between capital structure and the firm's value. Some theories have documented the relevancy of capital structure, while others have propagated the irrelevancy of capital structure on financial performance. Thus, there is no unanimous theory of capital structure. In this concern, Modigliani and Miller (MM) developed a broadly accepted modern theory of capital structure in 1958, known as the irrelevancy theory of capital structure. MM documented that mix of debt and equity has no significant effect on both size and performance of firms. In other words, whether a firm's capital consists of equity, debt, or a combination of both does not impact corporate value. MM theory is based on unrealistic assumptions such as a perfect capital market, no bankruptcy cost, frictionless capital markets, etc. Thus, several other theories have been developed after developing the theory of MM. One is the trade-off theory developed by Kraus and Litzenberge (1973). This theory states that the value of a firm can be maximized by using an optimum financial structure, and a firm can achieve the optimum capital structure by the interaction of competitive forces such as tax advantage of debt financing and bankruptcy costs etc.

Similarly, Jensen and Meckling (1976) analyzed the nature of agency costs originating from debt and equity in firms' capital structures. Jensen and Meckling developed a theory of agency costs by analyzing conflicts of interest between owners and managers and between owners and creditors. According to this theory, the optimal capital structure can be achieved by trading-off off agency costs against the benefits of debt. Another theory of capital structure based on a hierarchy of sources of financing is the pecking order theory developed by Myers and Majluf (1984). According to this theory, a firm prefers internal funds to low-risk debt, public debt, and new equity to fulfil financing requirements for new investments. This implies that the firm uses internal funds first, and when that is depleted, debt is issued, and when it is not reasonable to issue any more debt, equity is issued. Thus, more profitable firms should hold less debt because higher profits provide higher internal funds (Bevan & Danbolt, 2002).

Likewise, various empirical studies such as Rajan and Zingales (1995), Booth et al. (2001), Omet and Nobanee (2001), Al-Sakran (2001), Bevan and Danbolt (2002), and Chen (2004) have documented the significant association of capital structure with corporate financial performance.

Abor (2005) analyzed the influence of capital structure on the profitability of companies. They found a significant (positive) role of short-term debt to assets (SDA) on the return on equity

(ROE) of the corporation. Abor observed that more profitable firms use a higher level of short-term debt (85% of total debt) to finance their business activities and concluded the adverse relationship between long-term debt to assets (LDA) and ROE. A positive relationship exists between debt and a firm's financial performance in listed companies (Coleman, 2007).

Capital structure has a negative and significant effect on the financial performance of firms both in market and accounting measures (Tian & Zeitun, 2007). Profitability is negatively related to leverage (Shah & Khan, 2007). Joshi (2008) observed that profitability negatively relates to Nepalese firms' leverage. Chen et al. (2009) investigated the relationship between the insurance industry's capital structure, operational risk, and financial performance (profitability) using factor analysis and path analysis. Chen et al. found a negative relationship between a capital structure with profitability. In other words, a firm can increase its performance by increasing its equity ratio. Thus, the capital structure should have negative nexus with the firm's profitability.

Gill et al. (2011) investigated the impact of capital structure on the profitability of American manufacturing and service firms listed on the New York Stock Exchange using data from 272 firms from 2005 to 2007. The estimated result of the study showed positive nexus between long-term debt to assets and profitability, short-term debt to assets and profitability, and total debt to assets and profitability. Javed and Imad (2012) observed a negative relationship between a firm's profitability and financial leverage, implying the inverse nexus between profitability and financial leverage of the firms.

Financial leverage has a negative but significant role in determining return on assets (Omondi & Muturi, 2013). Similarly, Nguyen and Nguyen (2015) investigated the effect of capital structure on financial performance (ROE, ROA & Tobin's Q) and found a negative impact of capital structure on the financial performance of the firms. In the analysis of the effect of capital structure and profitability of SMEs in the UK for the period 1998 to 2008, Abeywardhana (2015) used a two-stage least square model and observed negative nexus between capital structure (debt to equity, debt to assets, short-term to assets & long-term debt to assets ratios) and financial performance (ROA & return on capital employed) of non-financial firms.

Nasimi (2016) examined the effect of financial leverage (capital structure) on the financial profitability of 30 firms on the London Stock Exchange. Nasimi used data for 2005 to 2014 and found an inverse role of debt to equity on return on capital employed and ROA. In contrast, there is a positive and significant effect on return on equity. In addition, Nasimi observed a positive and significant role of interest coverage on return on capital investment, equity, and asset return. Finally, the results of this study concluded that the optimal capital structure should be maintained for the targeted financial performance of business firms.

Semuel and Widjojo (2016) investigated the nexus between capital structure and profitability of property and construction-related firms from 2009 to 2013. Samuel and Widjojo used gross profit margin, net profit margin, ROE, and ROA as the firm's profitability (financial

performance) and short-term debt to assets, long-term debt to assets, total debt to assets, and total debt to equity as capital structure. The estimated result showed a significant positive nexus between capital structure (debt ratios) and the firms' profitability. There is an inverse but significant nexus between debt capital and financial performance in Indian cement companies (Singh & Singh, 2016).

Ghayas and Akhter (2018) investigated the relationship between capital structure and profitability of pharmaceutical companies of India listed on the Bombay Stock Exchange using regression methods and showed a positive effect of debt to assets on financial performance. This implies that firms using more debt capital can profit more because of the low-cost source of financing. Moreover, the result of the study observed a negative and weak nexus between long-term debt to assets and financial performance (measured by return on equity).

In Nepal, Jaishi and Poudel (2019) have documented the inverse relationship between capital structure and efficiency of a firm using annual data of 15 non-financial firms listed on NEPSE from 2005 to 2018. Jaishi and Poudel (2019) found that more efficient firms have used less financial leverage. Thus, they concluded that firms with higher financial leverage are less efficient. Similarly, Bhattarai (2020) found the significant impact of the capital structure measured by debt ratio and leverage on the financial performance of Nepalese insurance companies. Using the panel data of 14 insurance companies from 2007/08 to 2015/16, Bhattarai found a significant positive impact of debt ratio and financial leverage on financial performance measured by return on assets.

Likewise, insurance companies with higher debt ratios can make their better performance (Jaishi, 2020). Thus, the capital structure measured by debt ratio is the most significant factor for determining the financial performance of Nepalese insurance companies. Moreover, Bhatt and Jain (2020) documented that the profitability of Nepalese commercial banks is significantly predicted by capital structure.

The literature on empirical analysis shows the inconclusive results regarding the nexus between a firm's capital structure and performance. Very few studies have been made to analyze similar capital structure issues in business firms in the Nepalese context. Thus, this paper has attempted to examine the nexus between capital structure and financial performance of hydropower companies listed on the Nepal Stock Exchange (NEPSE). There is no long history of NEPSE. It started its trading floor in 1994. The financial sector dominates NEPSE, and very few non-financial companies are listed on NEPSE. Among the non-financial companies, hydropower companies are the actively traded companies of NEPSE. Thus, it is important to identify and analyze factors affecting the financial performance of these companies. Therefore, this study examines the effect of capital structure on the financial performance of Nepalese hydropower companies.

2. METHODOLOGY

2.1 Research Design

This study has followed a descriptive and causal-comparative research design to deal with the various issues raised in this paper. This study is an attempt to analyze the impact of the capital structure measured by the ratio of short-term debt to capital (SDC), long-term debt to capital (LDC), total debt to capital (TDC), and debt to asset (DR) ratios on financial performance measured by return on equity (ROE). The variables' facts and behavior have been analyzed using a descriptive research design. Similarly, a causal-comparative research design has been adopted to determine the effect of capital structure on financial performance.

2.2 Selection of Sample

The main aim of this paper is to investigate the impact of capital structure on the financial performance of Nepalese hydropower companies. For this purpose, annual data of hydropower listed on the Nepal Stock Exchange (NEPSE) for 2005/06 to 2019/20 have been used. There are 33 hydropower companies listed on NEPSE by mid-July 2020. Those hydropower companies have been selected as a sample that have generated revenue from electricity sales for the last three consecutive years because some NEPSE-listed hydropower companies have not generated sales revenue from electricity sales till mid-July 2020. Out of 33 hydro companies, only 17 hydropower companies fulfilled this criterion. Therefore, this study is based on the unbalanced panel data of 17 hydropower companies.

2.3 Variables and Measures

The capital structure and financial performance can be measured by using different proxies. In this paper, four variables, short-term debt to capital, long-term debt to capital (LDC), total debt to capital (TDC) and debt to asset (DR) ratios, are used to measure the capital structure and return on equity (ROE) is used to measure the financial performance of Nepalese hydropower companies.

Table 1
Variables and Measures

Variables	Measures	Type
Capital structure	SDC (Short term debt to total capital)	$\frac{\text{Short term debt}}{\text{Total capital}}$
	LDC (Long-term debt to total capital)	$\frac{\text{Long term debt}}{\text{Total capital}}$
	TDC (Total debt to total capital)	$\frac{\text{Total debt}}{\text{Total capital}}$
	DR (Total Debt to Total Asset)	$\frac{\text{Total debt}}{\text{Total Assets}}$
Financial performance	ROE (Return on equity)	$\frac{\text{Net income after tax}}{\text{Shareholders' Equity}}$ Dependent variable

2.4 Model Specification

Intending to analyze the impact of capital structure on the financial performance of Nepalese hydropower companies, this paper has estimated the econometric model in equation 1.-

$$ROE_{it} = \alpha_0 + \alpha_1 SDC_{it} + \alpha_2 LDC_{it} + \alpha_3 TDC_{it} + \alpha_4 DR_{it} + \varepsilon_{it} \quad (1)$$

ROE_{it} is the return on equity and is considered a dependent variable which is the measure of financial performance of hydropower companies i for year t . Similarly, SDC , LDC , TDC , and DR are the independent variables that measure the capital structure. SDC_{it} is the ratio of short-term debt to total capital of hydropower company i for year t , LDC_{it} represents the ratio of long-term debt to total capital of hydropower company i for year t , TDC_{it} indicates the ratio of total debt to total capital of hydropower company i for year t , DR_{it} denotes the ratio of total debt to total assets of hydropower company i for year t , α_0 indicates intercept term, $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the regression coefficients and ε_{it} is the residual error term.

This study is based on unbalanced panel data of 17 hydropower companies listed on NEPSE from 2005/06 to 2019/20. Panel data can be analyzed using a common effect model (pooled regression), fixed effect, or random-effect model. Thus, before estimating multivariate regression models, this paper has selected appropriate models based on Breusch and Pagan Lagrangian multiplier test for pooled regression or random-effect model and the Hausman test for random effect or fixed-effect model.

3. RESULTS AND DISCUSSION

3.1 Descriptive Statistics

Table 2

Descriptive Statistics

Items	ROE	SDC	LDC	TDC	DR
Mean	8.12	0.1344	0.365	0.5251	0.4102
Std. Deviation	23.07	0.1508	0.2668	0.3804	0.4289
Minimum	-51.48	0.01	0	0.01	0.01
Maximum	157.51	0.86	0.86	1.92	0.84

Note. This table exhibits descriptive measures (mean, standard deviation minimum and maximum values) of financial performance and its explanatory variables of Nepalese 17 hydropower companies listed on NEPSE for 94 observations.

Table 2 shows that the hydropower industry has an average return on equity (financial performance) of 8.12 percent, with a minimum of negative 51.48 percent and a maximum of 157.51 percent. The average leverage (debt ratio) in hydropower companies of 0.4102 indicates less use of debt finance for the assets. Moreover, descriptive statistics show that an average of 13.44 percent of capital is financed by short-term debt. Average long-term debt to capital is observed at 36.5 percent, with a maximum of 86 percent and a minimum of zero. Furthermore, the result indicates an average value of total debt to capital is 52.51 percent, with a maximum of 192 percent and a minimum of one percent. Finally, the standard deviation of return on

equity of 23.07 percent shows the variation in the financial performance of hydropower companies, and standard deviations 0.1508, 2668, 3804, and 0.4289 indicate the variations of explanatory variables SDC, LDC, TDC, and DR respectively.

3.2 Impact of Capital Structure on Financial Performance

Multiple regression using common effect (pooled OLS), fixed effect, and random effect models have been estimated to investigate the nexus between financial performance and capital structure. Financial performance is measured by return on equity (ROE), regressed on capital structure (SDC, LDC, TDC, and DA) in each regression model. The results of the regression analysis are presented in Table 3. Panel A of Table 3 shows the result of all three regression models. Panel B demonstrates the Breusch and Pagan Lagrangian multiplier test and Hausman test.

Table 3

Result of Regression of Financial Performance on Capital Structure

Panel: A			
Variables	Pooled OLS Model	Fixed Effect Model	Random Effect Model
Constant	9.1749* (3.44)	11.9006* (2.33)	8.0880* (2.62)
SDC	38.907* (2.93)	33.3489** (2.16)	33.9120** (2.51)
LDC	18.3328*** (1.72)	25.2953** (2.25)	22.4850** (2.17)
TDC	62.1360* (7.09)	61.1648* (6.69)	61.8806* (7.31)
DR	-111.159* (-8.43)	-120.935* (-7.18)	-113.3236* (-8.73)
Wald χ^2	----	----	214.93*
Adjusted R ²	0.7003	----	----
R ² : within	----	0.7177	0.7165
R ² : between	----	0.5428	0.5699
R ² : overall	----	0.7074	0.7122
F-test	0.0000	0.0000	----

Panel: B			
Breusch and Pagan LM test		Hausman test	
χ^2	15.50	χ^2	1.20
p-value	0.0000	p-value	0.8773

Note. *, ** and *** indicate significance at one, five, and ten percent levels. The figures in the parentheses are the t-values.

The evidence from the result presented in Panel A of Table 3 depicts a significant association between capital structure and financial performance. The result shows a significant positive

coefficient of short-term debt to total capital (SDC), long-term debt to total capital (LDC), and total debt to total capital (TDC) in all the regression models. It implies that increasing the short-term, long-term, and total debt to capital can increase the financial performance of hydropower companies in Nepal. The positive impact of SDC on financial performance is similar to the finding of Abor (2005), Addae et al. (2013), Tailab (2014), and Ashraf et al. (2017) and contradicts the findings of Hajisaaid (2020). The positive impact of LDC and TDC on financial performance contradicts the findings of Addae et al. (2013), Tailab (2014), Ashraf et al. (2017), and Hajisaaid (2020).

Furthermore, Table 3 shows the significant negative coefficient of total debt to total assets (DR) in all the models. The negative coefficient of DR implies that Nepalese hydropower companies can increase their financial performance by decreasing total debt compared to total assets. The negative impact of DR on ROE (financial performance) is similar to the findings of Ashraf et al. (2017) and contradicts the findings of Hajisaaid (2020).

Since this study is based on panel data, it is important to identify the appropriate regression model among the common effect (pooled OLS), fixed effect, and random effect models. This paper uses the Breusch and Pagan LM test to select an appropriate model between common effect and fixed-effect or random-effect model. The Hausman test selects an appropriate model between the fixed and random effect models. The Breusch and Pagan LM test and Hausman test results are presented in Panel B of Table 3. The χ^2 of Breusch and Pagan LM test 15.50 ($p=0.0000<0.01$) depicts that the common effect model is inappropriate. Estimating the regression using a fixed-effect or random-effect model for the given data set would be appropriate. Likewise, the χ^2 of Hausman test 1.20 ($p=0.8773>0.05$) depicts that the random effect model is appropriate rather than a fixed-effect model. Thus, the effect of capital structure on Nepalese hydropower companies' financial performance is estimated using the random-effect model in equation 2.

$$\text{ROE} = 8.0880 + 33.9120 \text{ SDC} + 22.4850 \text{ LDC} + 61.8806 \text{ TDC} - 113.326 \text{ DR} \quad (2)$$

The result of the random effect model shows the value of Wald α^2 214.93 (significance at 1 percent level), which indicates that the estimated regression model is significant. Similarly, the value of R^2 (overall) 0.7122 implies that the selected capital structure variables have 71 percent explanatory power to explain the financial performance of Nepalese hydropower companies.

4. CONCLUSION AND IMPLICATIONS

This study explores the nexus between capital structure and financial performance. This study concludes that short-term debt to total capital, long-term debt to total capital, and total debt to total capital have a significant positive role in determining financial performance. This implies that Nepalese hydropower companies can increase their financial performance with an increase in short-term debt, long-term debt, and total debt to total capital. This paper also concludes that the total debt to total assets ratio significantly negatively affects Nepalese

hydropower companies' financial performance. This negative relationship implies that Nepalese hydropower companies can increase their financial performance by decreasing total debt to total assets. Thus, the management of the hydropower companies should increase short-term, long-term, and total debt to capital and focus on minimizing the use of debt to total assets to accelerate the financial performance in Nepal.

The implication of the findings of this study is in policymaking to formulate the optimal capital structure of hydropower companies. Policymakers should consider capital structure-related variables (short-term debt to capital, long-term debt to capital, total debt to capital and debt to assets, etc.) while formulating capital structure policy for the better financial performance of hydropower companies in Nepal.

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