# Effect of Leverage, Assets Growth, Market Capitalization and Firm Age on Profitability of Nepalese Commercial Banks

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## Abstract

*The study examines the effect of leverage, asset growth, market capitalization and firm age on the profitability of Nepalese commercial banks. Return on assets and return on equity are selected as the dependent variables. The selected independent variables are debt to equity ratio, debt to assets ratio, long-term debt to assets ratio, short-term debt to assets ratio, assets growth rate, market capitalization and firm age. The study is based on secondary data of 11 commercial banks with 110 observations for the period from 2012/13 to 2021/22. The data were collected from publications and websites of Nepal Rastra Bank (NRB), Ministry of Finance (MoF), and annual reports of the selected commercial banks. The correlation coefficients and regression models are estimated to test the significance and importance of leverage, assets growth, market capitalization and firm age on the profitability of Nepalese commercial banks.*

*The study showed that debt to equity ratio, debt to assets ratio and short-term debt to assets ratio have positive impact on return on equity. It indicates that higher the debt equity ratio, debt to assets ratio and short-term debt to assets ratio, higher would be the return on equity. In contrast, debt to equity ratio, debt to assets ratio and short-term debt to assets ratio have negative impact on return on assets. It indicates that higher the debt equity ratio, debt to assets ratio and short-term debt to assets ratio, lower would be the return on assets. Similarly, long-term debt to assets ratio and assets growth have negative impact on return on equity and return on assets. It means that increase in long-term debt to assets ratio and assets growth leads to decrease in return on equity and return on assets. Likewise, market capitalization has a positive impact on return on assets. It means that increase in market capitalization leads to increase in return on assets. However, firm age has a positive impact on return on equity and return on assets. It means that increase in firm age leads to increase in return on equity and return on assets.*

**Keywords:** return on equity, return on assets, debt ratio, short-term debt to assets ratio, assets growth, market capitalization and firm age

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# Introduction

The stability of the banking system is a prerequisite for an effective financial system and achieving economic growth. In particular, profitability is one of the key factors to ensure the stability of the banking system. With good profitability, the bank can benefit its own shareholders and continue to be a channel of capital to support other investments of individuals and organizations, thereby promoting the development of the whole economy. In contrast, with poor financial results, banks may face bankruptcy, creating/contributing to exacerbating financial crises, thereby leading to severe consequences for the global economy. Therefore, the interest in managing the profitability of banks is always a topic of concern for bank leaders, investors, depositors, and the government (Phan *et al*., 2020). Bank profitability is a key factor shaping financial development and economic growth (Osuagwu, 2014). According to Yazdanfar (2013), one of the importance preconditions for long-term firm survival and success is firm profitability. Profitability is the company's ability to generate profits with all the capital working in it. The growth of the company's profitability is one of the critical indicators for investors in assessing the company's prospects in the future. The higher the ability to earn profits, the greater the return expected by investors, thus making the company value better (Pamadanu, 2013).

Profitability has always been a central measure to determine or analyze company's performance. Changes in bank's profitability could affect the national economic progress as profits influence the investments decision of companies. Therefore, an adequate profitability is important and critical for bank's long-term survival and success. (Menicucci and Paolucci, 2016).It is important to examined the profitability determinants in order to understand how companies finance their operations. According to Handriani and Robiyanto (2018), profitability is one of the most important goals of financial management besides maximizing the owner's wealth. An unprofitable business is impossible to survive. Conversely, highly profitable businesses have the ability to reward their owners with large profits on their investments. Therefore, the ultimate goal of a business entity is to gain a profit to ensure its business continuity under the prevailing market conditions.

Malik (2011) investigated factors affecting the profitability of 35 listed life and non-life insurance companies from 2005 to 2009 in Pakistan. The study revealed that leverage ratio has a negative and significant relationship with firm profitability. Shah and Khan (2017) examined factors affecting commercial banks profitability in Pakistan. The study found that equity to assets and debts to assets have a significant influence on the profitability of banks in Pakistan.Moreover, Awan *et al*. (2011) found a negative

but statistically significant relationship between debts to assets and profitability. In addition, Dogan (2013) investigated the effect of firm age on profitability. The result showed a negative relationship between firm age and return on assets. The increase in age of the firms cause a decrease in their profitability.However, Illaboya and Ohiokha (2016) investigated the relationship between company age, company size and profitability. The result showed a significant positive relationship between firm age and profitability.Likewise, Basti *et al.* (2011) showed a positive relationship between age and profitability measures including return on assets, return on equity and basic earning power. Similarly, Zhengchao and Qin (2012) analyzed the relationship between Chinese banking market structure and performance. The results showed that China banking market is still in the oligopoly status, and the oligopoly degree reduces gradually over time. The result also indicates that there is a negative relationship between market capitalization and profitability.

Rahman (2017) examined the relationship between solvency ratios and profitability ratios. The study found that debt to equity ratio, debt to assets ratio and long-term debt to assets ratio have negative relationship with profitability. In addition, Velnampy and Niresh (2012) investigated relationship between capital structure and profitability. The study revealed that there is a positive association between debt-to-equity ratio and return on equity. Similarly, Vahed (2014) examined the relationship between debt financing and profitability. The study revealed that there is a negative and significant relationship between debt to assets ratio and profitability. Hajisaaid (2020) investigated the effect of capital structure on profitability of Saudi Arabian firms. The result showed that there is a negative relationship between total debt to total assets ratio and profitability. In addition, Mboi*et al.* (2018) examined the effect of short-term debt to total assets ratio on financial performance of medium-sized and large enterprises in Kenya. The result showed that there is a significant negative relationship between short term debt to total assets ratio and profitability. Likewise, Salim and Yadav (2012) found there is a positive relationship between the growth and profitability in Malaysian listed companies during 1995-2011. Inyiama*et al.* (2017) investigated the relationship between assets growth rate and financial performance of manufacturing firms in Nigeria. The result showed that non-current assets growth rate and net assets growth rate of manufacturing firms in Nigeria are positively and strongly related to the profitability. Likewise, Bianco *et al.* (2013) assessed the impact of age and size of family-owned businesses on financial decisions. The study found that a business's profitability declines with age, but in specific sectors, older companies perform better than younger companies. Moreover, Lasis*et al.* (2018) examined the effects of firm growth on the profitability of listed agricultural and agro allied firms in Nigeria. The result showed that firm age has

a significant negative effect on profitability. Similarly, Gul *et al.* (2011) examined the relationship of bank-specific and macro-economic characteristics with bank profitability. The study revealed that there is a significant positive impact of market capitalization on profitability of the banks in Pakistan. Further, Kabajeh*et al.* (2012) assessed the relationship between market capitalization and profitability of Jordanian insurance public companies. The results showed market capitalization has a significant positive impact on the profitability. Ali and Puah (2019) examined the internal determinants of bank profitability and stability in Pakistan banking sector. The results indicated that bank size, credit risk, funding risk and stability have statistically significant impacts on profitability, while liquidity risk showed the statistically insignificant impact on profitability. The results also revealed that bank size, liquidity risk, funding risk and profitability have statistically significant impacts on stability, while credit risk has an insignificant effect on stability.

In the context of Nepal, Bam *et al.* (2015) analyzed the determinants of profitability in Nepalese commercial banks. The result showed that leverage has a significant positive impact on the return on assets of the commercial banks. Ghimire (2014) investigated the impact of income structure on firm profitability. The result showed an insignificant relationship between the age of the firm and its profitability. Moreover, Pradhan and Shrestha (2015) found that long term debt to total assets, total debt to total assets, debt to equity ratio, and interest coverage ratio are the major variables that determines the banks` profitability. Similarly, Maharjan (2017) found that long term debt to equity ratio, total debt to equity ratio, bank size, and liquidity position are negatively related to firm performance. Acharya (2019) concluded that long term debt to assets and total debt to total equity are statistically significant with ROE and ROA. In addition, Ojha (2018) assessed the relationship between liquidity, profitability and bank specific variables in Nepalese commercial banks. The study showed that leverage has a positive and significant correlation with return on assets but negative and significant correlation with return on equity. Moreover,Hamal (2020) examined the impact of firm specific factors on financial performance of life insurance companies in Nepal. The result showed that higher the age of the company, the more difficult it will be to accumulate profit. Poudel (2019) showed a positive relationship of firm age with return on asset (ROA) and return on equity (ROE).

The above discussion shows that empirical evidences vary greatly across the studies on the effect of leverage, assets growth, market capitalization and firm age on profitability. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such findings using more recent data exist in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The main purpose of the study is to analyze the effect of leverage, assets growth, market capitalization and firm age on the profitability of Nepalese commercial banks. Specifically, it examines the relationship of debt-to-equity ratio, debt to assets ratio, long-term debt to assets ratio, short-term debt to assets ratio, assets growth rate, market capitalization and firm age with return on equity and return on assets of Nepalese commercial banks.

The remainder of this study is organized as follows. Section two describes the sample, data and methodology. Section three presents the empirical results and the final sections draws conclusion and discusses the implications of the study findings.

## Methodological aspects

The study is based on the secondary data which were gathered from 11 Nepalese commercial banks from 2012/13 to 2021/22, leading to a total of 110 observations. The data were collected from publications and websites of Nepal Rastra Bank (NRB), Ministry of Finance (MoF), and annual reports of the selected commercial banks. This study is based on descriptive as well as causal comparative research designs. Table 1 shows the list of commercial banks selected for the study along with the study period and number of observations.

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

| S.N. | Name of the organizations | Period | Observations |
|---|---|---|---|
| 1 | Nabil Bank Limited | 2012/13-2021/22 | 10 |
| 2 | Nepal Investment Mega Bank Limited | 2012/13-2021/22 | 10 |
| 3 | Global IME Bank Limited | 2012/13-2021/22 | 10 |
| 4 | Nepal SBI Bank Limited | 2012/13-2021/22 | 10 |
| 5 | Himalayan Bank Limited | 2012/13-2021/22 | 10 |
| 6 | Everest Bank Limited | 2012/13-2021/22 | 10 |
| 7 | NMB Bank Limited | 2012/13-2021/22 | 10 |
| 8 | Agricultural Development Bank Limited | 2012/13-2021/22 | 10 |
| 9 | Siddhartha Bank Limited | 2012/13-2021/22 | 10 |
| 10 | Laxmi Bank Limited | 2012/13-2021/22 | 10 |
| 11 | Citizens Bank International Limited | 2012/13-2021/22 | 10 |
| **Total number of observations** | | | **110** |

Thus, the study is based on the 110 observations.

## The model

The model used in this study assumes that profitability depends on leverage, assets growth, market capitalization and firm age. The dependent variables selected for the study are return on equity and return on assets. Similarly, the selected independent variables in this study are debt to equity ratio, debt to assets ratio, long-term debt to assets ratio, short-term debt to assets ratio, assets growth rate, market capitalization and firm age. The following model equations are designed to test the hypothesis.

$$ROE_{it} = \alpha + \beta_1 DE_{it} + \beta_2 DA_{it} + \beta_3 LTDTA_{it} + \beta_4 STDTA_{it} + \beta_5 AG_{it} + \beta_6 MC_{it} + \beta_7 FA_{it} + \varepsilon_{it}$$

$$ROA_{it} = \alpha + \beta_1 DE_{it} + \beta_2 DA_{it} + \beta_3 LTDTA_{it} + \beta_4 STDTA_{it} + \beta_5 AG_{it} + \beta_6 MC_{it} + \beta_7 FA_{it} + \varepsilon_{it}$$

Where,

ROE = Return on equity as measured by the ratio of net profit after tax to total equity, in percentage.

ROA = Return on assets as measured by the ratio of net profit after tax to total assets, in percentage

DE = Debt to equity ratio as measured by the ratio of total debt (sum of long-term debt and short-term debt) to total equity, in ratio.

DA = Debt to assets ratio as measured by the ratio of total debt (sum of long-term debt and short-term debt) to total assets, in ratio.

LTDTA = Long-term debt to assets ratio as measured by the ratio of long-term debt to total assets, in ratio.

STDTA = Short-term debt to assets ratio as measured by the ratio of short-term debt to total assets, in ratio.

AG = Assets growth as measured by the ratio of change in assets to beginning period of assets, in percentage.

MC = Market capitalization as measured by the number of outstanding shares multiply by current market price per share, Rs in billion.

FA = Firm age as measured by the number of years from the firms' incorporation date, in years.

The following section describes the independent variables used in this study along with hypothesis formulation.

## Debt to equity ratio

Addae*et al.* (2013) examined the relationship between capital structure and profitability on listed companies in Ghana. The study showed that there is a negative relationship between debt-to-equity ratio and profitability. Moreover, Rahman (2017) examined

the relationship between solvency ratios and profitability ratios. The result showed that there is a negative relationship between total debt to equity ratio and profitability. Furthermore, Ahmad et al. (2012) examined the effect of capital structure on the profitability of 16 cement firms listed in Karachi Stock Exchange. The study showed that there is a negative relationship between debt-to-equity ratio and profitability. Similarly, Rajanand Zingalas (1995) found that there is a significant negative correlation between profitability and debt to equity ratio. Likewise, Singh and Singh (2016) examined the effect of capital structure on performance on top ten cement companies of India. The study revealed that there is a negative relationship between debt-to-equity ratio and profitability. Furthermore, Ebaid (2009) assessed the impact of capital structure choice on firm performance. The study showed that there is a negative impact of debt-to-equity ratio on profitability. Based on it, this study develops the following hypothesis.

*$H_1$: There is negative relationship between debt-to-equity ratio and bank profitability.*

## Debt to assets ratio

Azhagaiah and Gavoury (2011) examined the impact of capital structure on the profitability with special reference to IT industry in India. The study showed that there is a negative relationship between debt to assets ratio and profitability. Similarly, San and Heng (2011) examined the impact of capital structure on the profitability of the structure firms listed in the main board of bursa Malaysia. The study showed that there is a negative impact of debt to assets ratio on profitability. Tailab (2014) examined the relationship between capital structure and performance of a sample 30 Energy American firms. The study revealed that there is a negative and insignificant relationship between debt to assets ratio and profitability. In addition, Kester (1986) found that there is a significant negative relationship between profitability and debt to asset ratios. Moreover, Vahed (2014) examined the relationship between debt financing and profitability. The study revealed that there is a negative and significant relationship between debt to assets ratio and profitability. Likewise, Hamid *et al.* (2015) investigated the impact of capital structure on the profitability of 46 family and non-family firms in Malaysia. The study found that there is a negative relationship between debt to assets ratio and profitability. Hajisaaid (2020) investigated the effect of capital structure on profitability of basic materials Saudi Arabia firms. The result showed that there is a negative relationship between total debt to total assets ratio and profitability. Based on it, this study develops the following hypothesis.

*$H_2$: There is negative relationship between debt to assets ratio and bank profitability.*

## Long-term debt to assets ratio

This ratio indicates a general measure of the long-term financial position of a company, including its ability to meet its financial obligations for outstanding loans. Yapa (2015) investigated the impact of capital structure on the profitability of non-financial SMEs firms in UK. The study revealed that there is a negative relationship between long-term debt to assets ratio and profitability. Yegon*et al.* (2014) examined the relationship between capital structure and profitability in the banking sector in Kenya. The result showed that there is a negative relationship between long-term debt to assets ratio and profitability. Similarly, Vahed (2014) examined the relationship between debt financing and profitability. The study revealed that there is a negative and significant relationship between long-term debt to assets ratio and profitability. In addition, Hajisaaid (2020) showed that there is a negative relationship between long- term debt to total assets ratio and firm profitability in the context of Saudi Arabia. Moreover, Javed*et. al.* (2019) examined the impact of capital structure on firm performance of Pakistani firms. The study found that there is a significant but negative impact of long-term debt to assets ratio on profitability. Furthermore, Sheikh and Wang (2013) investigated the impact of capital structure on performance of non-financial listed firms in Pakistan. The study showed that there is a negative effect of long-term debt to assets ratio on firm profitability. Based on it, this study develops the following hypothesis.

*H$_3$: There is negative relationship between long-term debt to assets ratio and bank profitability.*

## Short-term debt to assets ratio

Short-term debt to assets ratio shows how much of the enterprise's total assets are financed using loans and financial debts lasting for one year or less. Mboi*et al.* (2018) examined the effect of short-term debt to total assets ratio on financial performance of medium-sized and large enterprises in Kenya. The result showed that there is a significant negative relationship between short-term debt to total assets ratio and profitability. Likewise, Hajisaaid (2020) investigated the effect of capital structure on the profitability of Saudi Arabian firms. The result showed that short-term debt to total assets ratio is negatively related to firm profitability. In addition, Chechet and Olayiwola (2014) examined the relationship between capital structure and profitability of Nigerian quoted firms. The study found that short-term debt to assets ratio has a negative impact on firm profitability. Moreover, Ebaid (2009) assessed the impact of capital structure choice on firm performance in the context of Egypt. The study showed that there is a negative impact of short-term debt to assets ratio on firm profitability. Similarly,

Abor (2007) investigated the debt policy and performance of SMEs ofGhanaian and South African firms. The study found that short-term debt to assets ratio has negative and statistically significant impact on profitability of firms for both Ghana and South Africa. Furthermore,Ahmad *et al.* (2012) investigated the impact of capital structure on firm performance of Malaysian firms. The results showed that short-term debt to assets ratio has a negative impact on profitability. Based on it, this study develops the following hypothesis.

$H_4$: *There is negative relationship between short term debt to total assets ratio and bank profitability.*

## Assets growth

Asset growth is calculated as a percentage change of assets at a certain time against the previous year. Chronopoulos*et al.* (2015) found faster growing banks appear more profitable than their slower growth counterparts. Salim and Yadav (2012) found there is a positive relationship between the asset growth and profitability in Malaysian listed companies during 1995-2011. Similarly,Inyiama*et al.* (2017) investigated the relationship between assets growth rate and financial performance of manufacturing firms in Nigeria. The study showed that assets growth rate of manufacturing firms in Nigeria positively and strongly related to the profitability. In addition, Soumadi and Hayajneh (2012) investigated the impact of capital structure on the profitability of 76 listed in the Amman stock market for the period 2001 to 2006. The study showed that there is a positive relationship between assets growth and profitability. Likewise, Goyal (2013) found that assets growth has a positive relationship with return on asset, return on equity and earning per share. Glancey (1998) investigated the determinants of growth and profitability in small entrepreneurial firms. The study revealed that there is a positive relationship between firm's profitability and growth. Furthermore, Mukhopadhyay and Khalkhali (2010) found that there is a positive and significant relationship between assets growth and profitability. Based on it, this study develops the following hypothesis.

$H_5$: *There is a positive relationship between assets growth and bank profitability.*

## Market capitalization

Market capitalization is the total monetary value of all outstanding shares of a company. Gul *et al.* (2011) investigated the relationship between bank-specific and macro-economic characteristics over bank profitability. The study revealed that there is a significant positive impact of market capitalization on the bank profitability in

the context of Pakistan. Kabajeh*et al.* (2012) assessed the relationship between market capitalization and profitability of Jordanian insurance public companies. The study showed that there is a significant positive impact of market capitalization on profitability. Moreover,Oluwatoyin and Gbadebo (2009) examined the impact of share market capitalization on a company's performance in Nigeria. The study revealed that there is a positive relationship between the market capitalization and the profitability of the Nigerian confectionary firms. Likewise, Oztop*et al.* (2018) investigated the impact of market capitalization on profitability of Turkish informatics and technology firms. The study showed that there is a positive relationship between market capitalization and profitability. Similarly, Haugen and Baker (1996) examined the determinants of market capitalization. The study revealed that there is a positive and significant impact of market capitalization on profitability. Furthermore, Ugwunta*et al.* (2012) assessed the relationship between market capitalization and profitability of Nigerian banking industry. The study showed that market capitalization is positively and significantly related to bank profitability. Based on it, this study develops the following hypothesis.

*$H_6$: There is a positive relationship between market capitalization and bank profitability.*

## Firm age

Coad *et al.* (2013) found that a firm's profitability deteriorates with age, given that older firms have difficulties in converting employment growth to profit growth, whereas young firms' expected growth rate is higher. Dogan (2013) found a negative relationship between firm age and profitability. Likewise, Bianco *et al.* (2013) assessed the impact of age and size on family-owned businesses' financial decisions. The study found that a business's profitability declines with age, but in specific sectors, older companies perform better than younger companies. Similarly, Lasis*et al.* (2018) showed that there is a significant negative impact of firm age on profitability of listed agricultural and agro allied firms in Nigeria. Moreover, Kipesha (2013) examined the impact of firm size and age on the performance of microfinance institutions in Tanzania.The result showed that there is a negative impact of firm age on the profitability of microfinance. However, Ammar *et al.* (2003) examined the relationship between the age and firm's performance. The study showed that the age of the firm improves its profitability. Based on it, this study develops the following hypothesis.

*$H_7$: There is a negative relationship between firm age and bank profitability.*

# Results and discussion

## Descriptive statistics

Table 2 presents the descriptive statistics of the selected dependent and independent variables during the period 2011/12 to 2020/21.

## Table 2: Descriptive statistics

*This table shows the descriptive statistics of dependent and independent variables of 11 Nepalese commercial banks for the study period of 2012/13 to 2021/22. The dependent variables are ROE (Return on assets as measured by net profit after tax to total equity, in percentage) and ROA (Return on assets as measured by net profit after tax to total assets, in percentage). The independent variables are DE (Debt to equity ratio as measured by sum of short-term debt plus long- term debt to the total equity, in ratio), DA (Debt to assets ratio as measured by sum of short-term debt plus long- term debt to the total assets, in ratio), LTDTA(Long-term debt to total assets ratio as measured by total long-term debt to the total asset, in ratio), STDTA (Short-term debt to total assets ratio as measured by total short-term debt to the total assets, in ratio), AG (Assets growth as measured by changing value of assets divided by beginning period of assets, in percentage), MC (Market capitalization as measured by multiplying between number of outstanding shares and current market price per share, Rupees in billion) and FA (Firm age as measured by number of years from the firms incorporation date, in years).*

| Variables | Minimum | Maximum | Mean | S.D. |
|-----------|---------|---------|------|------|
| ROE | 2.31 | 173.78 | 17.43 | 16.00 |
| ROA | 0.28 | 3.57 | 1.67 | 0.53 |
| TDTE | 3.82 | 90.92 | 9.53 | 8.20 |
| TDTA | 0.79 | 1.09 | 0.89 | 0.04 |
| LTDTA | 0.00 | 0.07 | 0.01 | 0.01 |
| STDTA | 0.76 | 1.07 | 0.88 | 0.04 |
| AG | -5.75 | 80.59 | 21.10 | 14.05 |
| MC | 5.79 | 188.72 | 33.74 | 28.42 |
| FA | 4.00 | 53.00 | 21.68 | 12.08 |

Source: SPSS output

## Correlation analysis

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

## Table 3: Pearson's correlation coefficients matrix

*This table shows the bivariate Pearson's correlation coefficients of dependent and independent variables of 11 Nepalese commercial banks for the study period of 2012/13 to 2021/22 The dependent variables are ROE (Return on assets as measured by net profit after tax to total equity, in percentage) and ROA (Return on assets as measured by net profit after tax to total assets, in percentage). The independent variables are DE (Debt to equity ratio as measured by sum of short-term debt plus long- term debt to the total equity, in ratio), DA (Debt to assets ratio as measured by sum of short-term debt plus long- term debt to the total assets, in ratio), LTDTA(Long-term debt to total assets ratio as measured by total long-term debt to the total asset, in ratio), STDTA (Short-term debt to total assets ratio as measured by total short-term debt to the total assets, in ratio), AG (Assets growth as measured by changing value of assets divided by beginning period of assets, in percentage), MC (Market capitalization as measured by multiplying between number of outstanding shares and current market price per share, Rupees in billion) and FA (Firm age as measured by number of years from the firms incorporation date, in years).*

| Variables | ROE | ROA | DE | DA | LTDTA | STDTA | AG | MC | FA |
|---|---|---|---|---|---|---|---|---|---|
| **ROE** | 1 | | | | | | | | |
| **ROA** | 0.230* | 1 | | | | | | | |
| **DE** | 0.949** | -0.071 | 1 | | | | | | |
| **DA** | 0.185 | -0.165 | 0.267** | 1 | | | | | |
| **LTDTA** | -0.132 | -0.210* | -0.055 | -0.067 | 1 | | | | |
| **STDTA** | 0.207* | -0.111 | 0.268** | 0.974** | -0.292** | 1 | | | |
| **AG** | -0.167 | -0.283** | -0.080 | 0.050 | -0.047 | 0.059 | 1 | | |
| **MC** | -0.057 | 0.077 | -0.110 | -0.247** | -0.185 | -0.196* | -0.074 | 1 | |
| **FA** | 0.044 | 0.572** | -0.118 | -0.299** | 0.075 | -0.305** | -0.406** | 0.406** | 1 |

*Source: SPSS output*

*Note: The asterisk signs (\*\*) and (\*) indicate that the results are significant at one percent and five percent levels respectively.*

Table 3 shows that there is a positive relationship between debt-to-equity ratio and return on equity in the context of Nepalese commercial banks. It indicates that increase in debt to equity ratio leads to increase in return on equity. Similarly, debt to assets ratio has a positive relationship with return on equity. It reveals that higher debt to assets ratio, higher would be the return on equity. Likewise, the study also shows that long-term debt to total assets ratio is negatively related to return on equity. It indicates that higher the long-term debt to total assets ratio, lower would be the return on equity. In addition, the study shows that short-term debt to total assets ratio is positively correlated to return on equity. It indicates that higher the short-term debt to total assets

ratio, higher would be the return on equity. In addition, assets growth is negatively correlated to return on equity. It reveals that increase in assets growth leads to decrease in return on equity. However, the study shows that firm age has a positive relationship with return on equity. It reveals that older the firm, higher would be the return on equity. Furthermore, the study also reveal that market capitalization is negatively correlated to return on equity. It indicates that increase in market capitalization leads to decrease in return on equity in the context of Nepalese commercial banks.

On the other hand, debt to equity ratio is negatively correlated to return on assets. It indicates that increase in debt to equity ratio leads to decrease in return on assets. The study also shows that debt to assets ratio is negatively correlated to return on assets. It indicates that increase in debt to assets ratio leads to decrease in return on assets. Likewise, long-term debt to assets ratio is negatively correlated to return on assets. It indicates that increase in long-term debt to assets ratio leads to decrease in return on assets. In addition, short-term debt to assets ratio is negatively correlated to return on assets. It indicates that increase in short-term debt to assets ratio leads to decrease in return on assets. In addition, assets growth is negatively correlated to return on assets. It reveals that increase in assets growth leads to decrease in return on assets. However, the study shows that firm age has a positive relationship with return on assets. It reveals that older the firm, higher would be the return on assets. Furthermore, the study also reveal that market capitalization is positively correlated to return on assets. It indicates that increase in market capitalization leads to increase in return on assets in the context of Nepalese commercial banks.

**Regression analysis**

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and results are presented in Table 4. More specifically, it shows the regression results of debt to equity ratio, debt to assets ratio, long-term debt to assets ratio, short-term debt to assets ratio, assets growth rate, market capitalization and firm ageof Nepalese commercial banks.

**Table 4: Estimated regression results of debt-to-equity ratio, debt to assets ratio, long-term debt to assets ratio, short-term debt to assets ratio, assets growth rate, market capitalization and firm age on return on equity**

The results are based on panel data of 11 commercial banks with 110 observations for the period of 2012/13-2021/22 by using the linear regression model and the model is ROE= $\beta_0 + \beta_1$ DE + $\beta_2$ DA + $\beta_3$ LTDTA + $\beta_4$ STDTA + $\beta_5$ AG + $\beta_6$ MC + $\beta_7$ FA+ e, where, the dependent variable is ROE (Return on assets as measured by net profit after

tax to total equity, in percentage). The independent variables are DE (Debt to equity ratio as measured by sum of short-term debt and long- term debt to the total equity, in ratio), DA (Debt to assets ratio as measured by sum of short-term debt plus long- term debt to the total assets, in ratio), LTDTA(Long-term debt to total assets ratio as measured by total long-term debt to the total asset, in ratio), STDTA (Short-term debt to total assets ratio as measured by total short-term debt to the total assets, in ratio), AG (Assets growth as measured by changing value of assets divided by beginning period of assets, in percentage), MC (Market capitalization as measured by multiplying between number of outstanding shares and current market price per share, Rupees in billion) and FA (Firm age as measured by number of years from the firms incorporation date, in years).

| Models | Intercept | Regressions coefficients of | | | | | | | Adj. R_bar$^2$ | SEE | F- value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DE | DA | LTDTA | STDTA | AG | MC | FA | | | |
| 1 | -0.225 (0.303) | 1.852 (31.340)** | | | | | | | 0.900 | 5.059 | 982.170 |
| 2 | -48.995 (1.444) | | 74.795 (1.961)* | | | | | | 0.025 | 15.795 | 3.841 |
| 3 | 20.332 (7.837)** | | | -223.153 (1.380) | | | | | 0.008 | 15.933 | 1.906 |
| 4 | -52.665 (1.650) | | | | 80.102 (2.199)* | | | | 0.034 | 15.725 | 4.836 |
| 5 | 21.430 (7.835)** | | | | | -0.190 (1.755) | | | 0.019 | 15.849 | 3.080 |
| 6 | 18.516 (7.775)** | | | | | | -14.222 (0.596) | | 0.006 | 16.047 | 0.355 |
| 7 | 16.163 (5.120)** | | | | | | | 0.058 (0.458) | 0.007 | 16.058 | 0.210 |
| 8 | 25.652 (2.353)* | 1.890 (31.483)** | 29.547 (2.379)* | | | | | | 0.904 | 4.953 | 515.106 |
| 9 | 29.240 (2.755)** | 1.883 (32.417)** | 31.446 (2.614)** | -141.381 (2.900)** | | | | | 0.910 | 4.790 | 369.995 |
| 10 | 29.330 (2.768)** | 1.882 (32.449)** | 979.383 (1.120) | -1149.842 (1.316) | 1010.978 (1.156) | | | | 0.911 | 4.783 | 278.709 |
| 11 | 29.362 (2.895)** | 1.864 (33.422)** | 903.134 (1.078) | -1078.384 (1.289) | 932.025 (1.113) | -0.103 (3.262)** | | | 0.918 | 4.577 | 245.570 |
| 12 | 28.764 (2.684)** | 1.865 (33.205)** | 887.503 (1.049) | -1060.409 (1.253) | 915.878 (1.082) | -0.102 (3.223)** | -10.981 (0.180) | | 0.917 | 4.599 | 202.743 |
| 13 | 14.166 (1.414) | 1.883 (37.317)** | 610.950 (0.804) | -801.911 (1.055) | 628.186 (0.826) | -0.035 (1.137) | -13.760 (1.729) | 0.210 (5.122)** | 0.934 | 4.121 | 220.107 |

*Notes:*

  i.    *Figures in parenthesis are t-values.*

  ii.   *The asterisk signs (\*\*) and (\*) indicate that the results are significant at one percent and five percent level respectively.*

  iii.  *Return on equity is the dependent variable.*

Table 4 shows that the beta coefficients for debt-to-equity ratio are positive with return on equity. It indicates that the debt to equity ratio has a positive impact on return on equity. This finding is inconsistent with the findings of Addae*et al.* (2013). Likewise, the beta coefficients for debt to assets ratios are positive with return on equity. It indicates that debt to assets ratio has a positive impact on return on equity. This finding is inconsistent with the findings of Azhagaiah and Gavoury (2011). Similarly, the beta coefficient for long-term debt to assets ratio are negative with return on equity. It indicates that long-term debt to assets ratio has negative impact on return on equity. This finding is consistent with finding of Javed*et. al.* (2019). Likewise, the beta coefficients for the short-term debt to assets ratio are positive with return on equity. It indicates that short-term debt to assets ratio has a positive impact on return on equity. This finding is inconsistent with the findings of Yapa (2015). Likewise, the beta coefficients for the market capitalization are negative with return on equity. It indicates that market capitalization has a negative impact on return on equity. This finding is inconsistent with the findings of Oluwatoyin and Gbadebo (2009).Similary, assets growth has a negative relationship with return on equity. This finding is consistent with the findings of Anafo*et al.* (2015). Furthermore, the beta coefficients for firm age are positive with return on equity. It indicates that firm age has a positive impact on return on equity. This finding is consistent with the findings ofKipesha (2013).

**Table 5: Estimated regression results of debt-to-equity ratio, debt to assets ratio, long-term debt to assets ratio, short-term debt to assets ratio, assets growth rate, market capitalization and firm age on return on assets**

The results are based on panel data of 11 commercial banks with 110 observations for the period of 2012/13-2021/22 by using the linear regression model and the model is ROA= $\beta_0 + \beta_1$ DE + $\beta_2$ DA + $\beta_3$ LTDTA + $\beta_4$ STDTA + $\beta_5$ AG + $\beta_6$ MC + $\beta_7$ FA+ e, where, the dependent is ROA (Return on assets as measured by net profit after tax to total assets, in percentage). The independent variables are DE (Debt to  equity ratio as measured by  sum of short-term debt plus long- term debt to the total equity, in ratio), DA (Debt to assets ratio as measured by sum of short-term debt plus long- term debt to the total assets, in ratio), LTDTA(Long-term debt to total assets ratio as measured by total long-term debt to the total asset,  in ratio), STDTA (Short-term debt to total assets ratio as measured by total short-term debt to the total assets, in ratio), AG (Assets growth as measured by changing value of assets divided by beginning period of assets, in percentage), MC (Market capitalization as measured by multiplying between number of outstanding shares and current market price per share, Rupees in billion) and FA

(Firm age as measured by number of years from the firms incorporation date, in years).

| Models | Intercept | Regressions coefficients of | | | | | | | Adj. R_bar² | SEE | F-value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DE | DA | LTDTA | STDTA | AG | MC | FA | | | |
| 1 | 1.711 (22.137)** | -0.005 (0.735) | | | | | | | 0.004 | 0.527 | 0.541 |
| 2 | 3.608 (3.222)** | | -2.185 (1.735) | | | | | | 0.018 | 0.521 | 3.010 |
| 3 | 1.820 (21.633)** | | | -11.709 (2.234)* | | | | | 0.035 | 0.517 | 4.991 |
| 4 | 2.905 (2.726)** | | | | -1.415 (1.163) | | | | 0.003 | 0.525 | 1.352 |
| 5 | 1.891 (21.623)** | | | | | -0.011 (3.070)** | | | 0.072 | 0.507 | 9.428 |
| 6 | 1.619 (20.710)** | | | | | | 11.428 (0.804) | | 0.003 | 0.527 | 0.647 |
| 7 | 1.128 (13.229)** | | | | | | | 0.025 (7.241)** | 0.321 | 0.434 | 52.436 |
| 8 | 3.535 (3.069)* | -0.002 (0.290) | -2.083 (1.587) | | | | | | 0.010 | 0.523 | 1.534 |
| 9 | 3.851 (3.393)** | -0.002 (0.389) | -2.251 (1.750) | -12.460 (2.390)* | | | | | 0.051 | 0.512 | 2.972 |
| 10 | 3.860 (3.403)** | -0.003 (0.404) | 97.408 (1.036) | -111.527 (1.192) | -99.313 (1.060) | | | | 0.053 | 0.512 | 2.513 |
| 11 | 3.864 (3.554)** | -0.004 (0.736) | 88.979 (0.991) | -103.965 (1.159) | -90.958 (1.013) | -0.011 (3.221)** | | | 0.130 | 0.491 | 4.265 |
| 12 | 4.038 (3.520)** | -0.005 (0.764) | 93.542 (1.033) | -109.212 (1.205) | -95.672 (1.056) | -0.011 (3.238)** | 21.703 (0.492) | | 0.124 | 0.492 | 3.568 |
| 13 | 2.021 (2.070)* | -0.002 (0.428) | 55.319 (0.747) | -73.484 (0.992) | -55.909 (0.754) | -0.002 (0.583) | 17.097 (3.275)** | 0.029 (7.264)** | 0.417 | 0.402 | 12.135 |

*Notes:*

i.    *Figures in parenthesis are t-values.*

ii.   *The asterisk signs (\*\*) and (\*) indicate that the results are significant at one percent and five percent level respectively.*

iii.  *Return on assets is the dependent variable.*

Table 5 shows that the beta coefficients for debt-to-equity ratio are negative with return on assets. It indicates that the debt to equity ratio has a negative impact on return on assets. This finding is consistent with the findings of Yapa (2015). Likewise, the beta coefficients for debt to assets ratios are negative with return on assets. It indicates that debt to assets ratio has a negative impact on return on assets. This finding is consistent with the findings of Shah and Khan (2017). Similarly, the beta coefficient for long-term debt to assets ratio are negative with return on assets. It indicates that long-term debt to assets ratio has negative impact on return on assets. This finding is consistent with findings of Yegon*et al.* (2014). Likewise, the beta coefficients for the short-term

debt to assets ratio are negative with return on assets. It indicates that short-term debt to assets ratio has a negative impact on return on assets. This finding is inconsistent with the findings of Ahmad *et al.* (2012). Similarly, the beta coefficients for the assets growth are negative with return on assets. It indicates that assets growth has a negative impact on return on assets. This finding is inconsistent with the findings of Dahmash*et al.* (2021). Likewise, the beta coefficients for market capitalizationis positive with return on assets. It indicates that market capitalization has a positive impact on return on assets. This finding is consistent with the findings ofGenchev (2012).Furthermore, the beta coefficients for firm age are positive with return on assets. It indicates that firm age has a positive impact on return on assets. This finding is consistent with the findings ofLasis*et al.* (2018).

## Summary and Conclusion

Like other organizations, the banking industry is faced with turbulence arising from increased globalization, inter-nationalization, advancements in information, communication and technology and trade liberalization. The main success of a bank is the success in carrying out its functions and role as a financial intermediary. Bank performance is the basis for measuring whether banks have carried out management activities in accordance with sound banking rules according to applicable regulations.

This study attempts to analyze the effect of leverage, assets growth, market capitalization and firm age on the profitability of Nepalese commercial banks.The study is based on secondary data of 11 commercial banks with 110 observations for the study period from 2012/13 to 2021/22.

The study showed that debt to equity ratio, debt to assets ratio and short-term debt to assets ratio have positive impact on return on equity. In contrast, debt to equity ratio, debt to assets ratio and short-term debt to assets ratio have negative impact on return on assets. Similarly, long-term debt to assets ratio, and assets growth have negative impact on return on equity and return on assets. Likewise, market capitalization has a positive impact on return on assets. In contrast, market capitalization has a negative impact on return on equity. However, firm age has a positive impact on return on equity and return on assets. The study concluded that short term debt to equity ratio followed by debt to assets ratio is the most influencing factor that explains the change in the return on equity. Likewise, the study also concluded that the most influencing factor that determines the return on assets is market capitalization followed by assets growth in the context of Nepalese commercial banks.

## Recommendations and Implications

Based on the findings of the study, the following recommendations have been forwarded:

The study found positive impact of debt to equity ratio, debt to assets ratio and short-term debt to assets ratio on return on equity. Hence, the banks willing to increase return on equity can improve its debt position too which means there is no much risk in debt management. Similarly, If Nepalese Commercial Banks wants to improve their ROA, the increased capitalization can be much helpful whereas the increased capitalization is not of much advantage from viewpoint of equity as it has negative impact on ROE as per this study. As long term debt to total assets has negative correlation on both ROA and ROE, the commercial banks are advised not to increase their debt to increase total assets as this will decrease both the return on total assets as well return on equity which will eventually hamper the profitability position of banks.

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