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Stability of Commercial Banks in Nepal

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Abstract

The goal of this study is to identify the most important factors affecting the financial stability of Nepalese commercial banks. The financial data of selected Nepalese commercial banks was analyzed by using a panel data regression model (Fixed Effect Model). The findings of the study suggest that bank efficiency, profitability, and capital base are important internal variables, whereas banking sector development, GDP growth, inflation, and exchange rate are important external determinants in determining the financial stability of Nepalese commercial banks. Furthermore, the size of the bank, loan loss provision, and bank concentration are found to be minor determinants influencing the financial stability of Nepalese commercial banks.

Key words: Bank Stability, Stability Factors, Panel data model, Nepalese Banking, Commercial Banks

GEL Code: **C330, E440, G210**

Introduction

Financial stability refers to a situation in which the financial intermediation process runs smoothly, resulting in user confidence. In other words, financial stability refers to the smooth operation of a system of financial intermediation processes between among households, firms, and the government, which is facilitated by a variety of financial institutions and infrastructure. Because it facilitates the exchange of value, the financial system's stability in an economy is a crucial catalyst for economic growth (Swamy, 2014).

Banks and financial institutions promote the effective flow of funds from the surplus unit to the deficit unit, thereby promoting economic growth and development (Ratnovski, 2013). Bank's stability is ensured by the significant profitability in their operations as well as adequate liquidity, indicating that they have well a balanced asset and liability structure (Klaas & Vagizova, 2014). Bank stability in financial system or bank is a growing concern for the stakeholders such as regulators and bank supervisors. Stability of bank can be

influenced by various environmental factors. Factors may reside within an organization or around the economic circumstances.

Stability of financial system can be influenced by the variety of factors, both internal and external. Individual bank features that affect the bank's performance are referred to as internal variables. Internal management and board choices have a significant impact on these variables (Almazari, 2014). External factors are industry- or country-wide issues that affect bank profitability and are beyond the company's control (Azam, 2018). These factors were classified by Baselga-Pascual et al. (2015) as bank-specific factors and macroeconomic factors.

The importance of maintaining bank stability is an important topic for policymakers, both in developing and developed countries (Beck et al., 2006). Policymakers and regulators have put a lot of work into banking system reform in order to increase bank stability (Cihak et al., 2016). Furthermore, because the banking sector accounts for the majority of economic activity, it is critical to promote and improve the effectiveness of monetary policy transmission mechanisms as well as the efficient distribution of funding sources in the economy. Further, regulators place a strong emphasis on micro- and macro-prudential rules to ensure banking stability, but they ignore institutional and structural variables that influence bank stability (Demirgüç-Kunt & Detragiache, 2002).

In the recent few decades, the number of BFIs has increased as a result of the Nepalese government's financial liberalization policy, which began in the mid-1980s. The banking industry dominates Nepal's financial sector, which plays a significant role in financial intermediation in the country's economy. In FY 2076/77, BFIs held 78.66 percent of the financial system's total assets and liabilities, while commercial banks remained the dominant participant, accounting for 65.65 percent of the system's total assets. Therefore, commercial banks can better reflect the banking system's underlying behavior. Given the importance of commercial banks in Nepal, as well as current industry-specific and macroeconomic challenges, maintaining stability in this sector is critical. The importance of Nepal's commercial banks in economic development, combined with bank stability, is the driving force for this study.

As the banking sector's regulating authority, Nepal Rastra Bank strives to ensure financial stability in the banking sector through both direct and indirect measures. Identification of major factors of financial stability of Nepalese commercial banks is an important topic in this regard. In this context, the goal of this study is to look into the primary factors of commercial bank stability in Nepal.

Literature Review

There exits extensive number of studies conducted on stability of banking sector. Literature shows that some of the studies such as Adusei (2015), Ngaira & Miroga (2018), Pradhan & Shrestha (2018) etc. whereas the studies such as Altaee et al. (2013), Baselga-Pascual et al. (2015), IJtsma et al. (2017), (Ozili, 2018) etc. covers the banking industry of two or more than two countries.

Bank stability can be influenced by bank specific, industry specific and macro-economic variables. The impact of various variables can be varied in different financial system. Stability of commercial banks is determined primarily by bank specific factors represented by diversification of loan portfolio, bank size, non-interest share, brokered deposits and core deposits (Shim, 2019). Additionally, macroeconomic variables such as GDP growth and unemployment rate also influenced the bank's stability. Baselga-Pascual et al. (2015) finds that the banks stability/instability can be caused by macroeconomic factors and bank-specific factors.

Barik & Pradhan (2021) argues that financial inclusion has a negative and significant effect on financial stability due to rapid expansion of credit to the private sectors, erosion of credit standards of the banks, difficulties in credit assessment, increase in non-performing assets, credit defaults of the borrowers, and inadequate supervision of the banking sector. On the other hand, Neaime & Gaysset, (2018) and Albaity et al., (2019) find the positive influence of financial inclusion on financial stability.

Further, banks' stability is influenced by equity to total assets, non-deposit funding to total assets, return on assets, cost to income ratio, bank size, level of industry concentration, GDP growth, inflation and interest rates (Baselga-Pascual et al., 2015). Similarly, Ngaira & Miroga (2018) find the significant positive influence of interest rate, bank size and liquidity but negative influence of operational cost on financial stability.

Large number of studies such as Baselga-Pascual et al. (2015), Muhammad Ali & Puah (2019), Albaity et al. (2019), Kasri & Azzahra (2020), Dutta & Saha (2021) and others have used Z-score as a measure of bank stability or insolvency risk. According to this measure, lower risk of insolvency or instability is associated with a higher z-score value.

As a bank stability determinant, bank size has been widely assessed in different banking industries. The effect of bank size on bank stability can be viewed from the perspective of the concentration-stability and concentration-fragility hypotheses (Uhde & Heimeshoff, 2009). The concentration-stability hypothesis pleads that larger banks in concentrated banking sectors decrease financial fragility whereas the concentration-

fragility view submits that larger banks in a concentrated market decrease stability. Bank size can be measured in terms of total assets. Larger banks are more likely to have economies of scale advantages as compared to smaller banks and hence bank size positively affect its stability (De Haan & Poghosyan, 2012 ; Ngaira & Miroga, 2018). In contrast, Köhler (2015) and Rizvi et al. (2020) advocate that that bank size has a significantly negative impact on stability. But Altaee et al. (2013) find statistically insignificant relationship between size and stability of the bank.

Efficiency is the conduit through which competition contributes to stability (Schaeck & Cihák, 2014). But the study of Alber (2017) suggest that the banking efficiency and financial stability may be considered as conflicting goals and hence have negative relation with each other. Further the study of Dutta & Saha (2021) argue that the efficiency contributes to stability but the impact is moderated in the presence of competition.

Bank profitability influence financial stability from both theoretical and empirical perspectives (Xu et al., 2019). Study of Tan & Anchor (2016) revel that the lower bank stability leads to higher profitability and higher profitability leads to higher bank fragility. Further, Dinh & Pickler (2012), Le (2020), Tan et al. (2020) and others find that bank profitability is positively associated with bank stability whereas the study of Molyneux & Thornton (1992) shows a negative relationship between bank risk and profitability.

Large amount of loan in the balance sheet of banks make them susceptible to loan default arising from weak economic conditions which affects borrowers' ability to repay, requiring banks to keep sufficient loan loss provision in an expectation of probable loan losses (Laeven & Majnoni, 2003). Loan loss provision is an important factor that affect the performance and financial stability of the banks. A well-managed bank is perceived to be of lower loan loss provision and such an advantage will be translated into higher profitability (Mustafa et al., 2012).

Banks with high capital ratios are assumed to be safe whereas low bank capitalization leads to an increase in bank risk taking. Banks with higher equity ratio normally have a reduced need for external funding, which has a positive effect on their stability. Agoraki et al. (2011) argues that bank capitalization is negatively related to bank risk-taking but Barth et al. (2004) advocates that the capital resources are insufficient to achieve banking stability due to structural weaknesses.

Concentration-fragility view suggested by Boyd & De Nicoló (2005) argue that the increased competition in banking dilute the level of banking system stability but the study of De Haan & Poghosyan (2012) find that the market concentration has not significant impact on bank stability. Further, the study of Mohamed Ben Ali

et al. (2018) show that concentration has an impact on financial stability during crisis periods, but no direct effect on financial stability during normal periods. Concentration does not directly affect the financial stability but has a positive and stabilizing impact through the profitability channel and a negative and destabilizing impact through the channel of interest rate (Neupane, 2016).

In addition, the level of banking sector development also affects the financial stability. In general, highly developed banking industry ensures the financial stability as most of the dimensions of banking sector are highly certain and can easily absorb the ups and downs in an economy.

An important macroeconomic factor that affect banking stability is GDP growth. Simply, higher growth rate of real GDP is assumed a better condition for financial stability but it might not valid in the economies where credit and real economic cycles are highly correlated. The significant negative impact of GDP growth on bank stability has been found in the study of Männasoo & Mayes (2009). On the other hand, large number of studies such as Athanasoglou et al. (2008); Jokipii & Monnin (2013); Karim et al. (2016); Ozili (2018); Rizvi et al. (2020) find a positive relationship between GDP growth and bank stability.

Inflation rate and price stability have the direct bearing on the stability of financial system. The effect of inflation on bank stability depends on whether wages and other operating expenses increase at a faster rate than the inflation. If inflation is not predicted and banks do not adjust their interest rates correctly, there is a possibility that costs may increase faster than revenues and hence affect bank stability unfavorably. However, Bourke (1989) and Molyneux & Thornton (1992) find a positive relationship between inflation and stability.

Economies which operate under floating exchange rate regime are best able to absorb external shocks without impounding on their level of international reserves accumulated. However, fixed exchange rate operating economies are able to withstand exchange rate shocks so long as they have ample reserves. Eichengreen (1998) advocates that if threats to the financial stability of the banking system come from the outside, there is a case for exchange rate flexibility to discourage the banks from relying extremely on external sources of finance and to improve the capacity of the domestic authorities to act as lenders of last resort. Conversely, if the main threats to the stability of the banking system arise from inside, there is an argument for attempting to peg the exchange rate in order to discipline domestic policymakers and vent shocks via the external sector. In this regard, there is not a simple correlation between the exchange rate regime and the incidence of banking crises. Study of Kasri & Azzahra (2020) suggests that the exchange rate has positive impact on bank stability.

In addition, the study of Kabir et al. (2015) suggests that the determinants of banks' stability were bank size, profitability, efficiency and diversification of banks' income and macroeconomic factors like GDP growth and inflation. Further, Neupane (2015) shows that the bank's fundamental indicators including liquidity ratio, bank capitalization, capital volatility and bank ownerships have significant influence on stability of banks.

Rizvi et al. (2019) shows that the bank specific factors consisting of bank size, cost to income ratio and diversification of bank products have a negative influence on bank stability whereas Karim et al. (2016) finds that stability of banking industry is positively related to GDP and interest rate, meanwhile the relationship was negative with inflation rate. Similarly the study of Shim (2019) finds that stability amongst commercial banks is primarily determined by bank specific factors represented by diversification of loan portfolio, bank size, non-interest share, brokered deposits and core deposits.

Research Methodology

This study is based on quantitative data extracted from a variety of secondary sources based on their convenience and availability. In addition, a casual-comparative research design has been applied to investigate the cause-and-effect relationship between bank stability and its drivers. Furthermore, a descriptive study design has been employed to describe the current facts of Nepalese commercial banks in the area of study.

Data, Variables, Estimation Technique and Model Specification

Quantitative data from a variety of secondary sources have been utilized to identify the primary factors of financial stability among Nepalese commercial banks. For the period 2010 to 2020, the study looked at yearly data from 20 commercial banks. Therefore, this study covers the ups and downs of Nepalese banking, including the mid-2011 banking crisis, which was one of Nepal's worst financial disasters. There are currently 27 commercial banks, seven of which were participated in mergers or acquisitions at the commercial bank level are excluded. Furthermore, for the sake of convenience, this study used an eleven-year data set. This study used cross-sectional data, which is balanced panel since each cross-sectional unit (bank) contains the equal number of time series observations.

The principal sources of data are the Banking and Financial Statistics issued by Nepal Rastra Bank and the financial statements of banks available on their websites. Other relevant data has also been extracted from data released by the Ministry of Finance and World Bank reports.

On the basis of previous literature, important factors that might affect the bank stability of Nepalese commercial banks have been selected on judgmental basis. These factors can be internal and external factors. Table 1 shows the major factors and their notations used in this study.

Table-1: List of Variables and Description

Dependent Variables			**Notation Used**	**Description**
1		Overall bank risk/stability	Z-score	Bank's Z-score.
Independent Variables				
Internal Factors	1	Bank efficiency	BE	Operating expenses to operating income
	2	Profitability	ROA	Net income to Total assets
	3	Bank Size	SIZE	Natural Logarithm of total assets
	4	Capital	CAP	Percentage of equity to total assets
	5	Loan loss provision	LLP	Loan loss provision to total assets
External Factors	1	Concentration	CONC	Sum of market share of five largest banks in terms of total assets for each year
	2	Banking Sector Development	BSD	Banks' assets scaled by GDP
	3	GDP Growth	GDP	Annual growth rate of Real GDP
	4	Inflation	INF	Annual Inflation Rate
	5	Exchange Rate	EXR	Annual average of buying and selling rates of US Dollar

Z-score is a commonly used bank stability indicator which measures the ratio of bank buffer capital and profit to the risk of volatility in returns. The Z-Score measures how rapidly a company's profits drop before a bank's capital is depleted. In this study, Z-index has been used as a dependent variable which is an indicator of overall bank risk and a proxy of bank's stability. It is computed as:

$$Z - Score = \left[\frac{ROA_{it} + E_{it}/TA_{it}}{\sigma_{ROA_{it}}}\right]$$

Here, Z-Score represents bank stability, while ROA_{it} denotes return on asset. E_{it}/TA_{it} refers equity ratio (equity-to-total asset ratio) and $\sigma_{ROA_{it}}$ is the standard deviation of ROA. Additionally, "I" is an individual bank and "t" indicates a time period. A higher Z-score indicates a stronger mix of bank profitability and

capitalization which reduces the likelihood of bank failure. However, excessive volatility of bank earnings decreases the Z-score. And hence the higher the Z-score, the more stable it is the bank (Mercieca et al., 2007).

Bank efficiency measures the ratio of operating expenses and operation income. Efficient banking system ensures that the availability of higher level of operating income to cover the operating expenses. Study of Kasri & Azzahra (2020) finds the bank efficiency ratio as an important determinant of bank stability. Further, bank profitability impacts financial stability from both theoretical and empirical perspectives (Xu et al., 2019). Return on Assets (ROA) has been used as an indicator of bank profitability which is the ratio of net income and total assets.

Total asset has been used as a proxy of bank size. This variable is used to capture the effects of economies or diseconomies of scale in the banking sector. In this study, bank size is measured by natural logarithm of total assets. In addition, bank capital is arguably one of the most important targets of micro- and macro prudential regulation in banking all over the world (Thakor, 2014). Level of bank capital determine the financial stability. In this study, capital refers to the capital adequacy which is measured as the percentage of equity to total assets. It is an essential factor that determines capital strength (Abel & Roux, 2016).

Concentration is an indicator of market structure of banking industry. Level of banking concentration affect the banking stability. Here, concentration is measured as a sum of market share of five largest banks in terms of total assets for each year. Another factor that might affect the financial stability is the level of banking sector development. Highly developed banking sector ensures the financial stability. Banking sector development is measures as a banks' assets scaled by GDP.

GDP is a macroeconomic factor which is commonly used to measure the aggregate economic activity within an economy. This study has used annual growth rate of real GDP by following the study of (Neupane, 2020) conducted in Nepalese banking. Further, the rate of price change in economy might affect the banking stability. Higher inflation or price instability could adversely affect financial stability (Dhal et al., 2011). In addition, the exchange rate flexibility may be instrumental in curving the effect of capital inflows on domestic credit and hence results the financial instability (Magud et al., 2014). In this study foreign exchange rate of Nepalese rupees with US Dollar has been used as an exchange rate which is calculated as an annual average of buying and selling rates of US Dollar.

Data Analysis Technique

To begin, descriptive statistics has been employed to describe the factors affecting Nepalese commercial banks' stability. Afterward, a panel data regression model has been utilized to investigate the primary factors influencing the stability of Nepalese commercial banks. A panel data regression model analyzes group effects, time effects, or both to cope with heterogeneity or individual effects that may or may not be observed. These effects are either fixed or random. A fixed effect model examines whether intercepts differ by group or time period, whereas a random effect model examines error variance component changes by individual or time period.

Different tests have been performed for deciding the appropriate model among Pooled OLS, Fixed Effect Model and Random Effect Model. Fixed effects are tested by the "F-test", while random effects are examined by the "Lagrange multiplier (LM) test" (Breusch & Pagan, 1980). If the null hypothesis is not rejected in either test, the pooled OLS regression is favored. However, if the null hypothesis is rejected in either test, the Husman specification test is used to choose the best model between random and fixed effects. The Hausman specification test suggested by Hausman (1978) compares a random effect model to its fixed counterpart.

Model Specification

For an empirical assessment of Nepalese commercial banks' financial stability, the following model was developed:

$$z_{it} = \alpha + \beta_1 IF_{it} + \beta_2 EF_{it} + U_{it} \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Here, z_{it} denotes the stability of bank i at time t, IF and EF are internal factors and internal factors respectively and $U_{it}$is the error term.

Considering the variables used under this study, the empirical model becomes:

$$Z_{it} = \alpha + \beta_1 BE_{it} + \beta_2 ROA_{it} + \beta_3 SIZE_{it} + \beta_4 CAP_{it} + \beta_5 LLP_{it} + \beta_6 CONC_{it} + \beta_7 BSD_{it} + \beta_8 GDP_{it} + \beta_9 INF_{it} + \beta_{10} EXR_{it} + z_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

In equation, "Z" is an indicator of bank stability, α is constant term, BE is bank efficiency, ROA is return on assets, SIZE is bank size, CAP is capital, LLP is loan loss provision, CONC is five bank concentration ratio

in terms of assets, BSD is Banking Sector Development, GDP is annual growth rate of real GDP, INF is annual inflation rate, EXR is exchange rate and "z_{it}" is the error term.

If there is no individual effect (cross-sectional or time-specific effect), pooled ordinary least squares (Pooled OLS) produces efficient and consistent parameter estimations. Panel data models examine group (person-specific) effects, time effects, or both to deal with heterogeneity or individual effects that may or may not be observed. These effects are either fixed or random. A fixed effect model looks at whether intercepts differ by group or time period, whereas a random effect model looks at changes in error variance components by individual or over time (Hun, 2011).

The functional form of pooled OLS, fixed effect and random effect models are,

Pooled OLS model: $y_{it} = \propto + X'_{it}\beta + \varepsilon_{it}\ (u_i = 0)$

Fixed effect model: $y_{it} = (\alpha + u_i) + X'_{it}\beta + v_{it}$

Random effect model: $y_{it} = \propto + X'_{it}\beta + (u_i + v_{it})$

where u_i is a fixed or random effect specific to individual (group) or time period that is not included in the regression, and errors are independent identically distributed.

Empirical Findings

Description of the variables

The Z-score has been used as an indicator of commercial bank's financial stability, which ranges from 0.524 to -0.091, demonstrating that the stability of Nepalese commercial banks is highly variable. The average efficiency ratio for Nepalese banks is 0.714, showing that operating expenses account for 71% of operating income. However, a figure greater than one indicates a bank's susceptibility if operating expenses surpass operating income.

Further, the return on assets (ROA) varies from -0.96 to 8.29%, while the capital ratio varies from -9.69 to 16.76%, indicating the susceptibility of a few Nepalese commercial banks. The average loan loss provision of 1.86 percent and the average concentration ratio of 27 percent in the table imply that the five largest commercial banks account for 27 percent of the banking industry's total market share.

Table-2: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Z score	0.173	0.104	-0.091	0.524
BE	0.714	0.141	0.401	1.678
ROA	1.80	0.95	-0.96	8.29
Size	11.08	0.71	9.52	12.57
CAP	8.04	3.73	-9.69	16.76
LLP	1.86	1.55	0.48	11.04
CONC	0.27	0.02	0.25	0.31
BSD	1.04	0.16	0.84	1.32
GDP Growth	4.34	3.14	-2.09	8.98
INF	7.55	2.21	4.20	9.90
EXR	100.48	14.22	72.27	120.37

As per the table 2, the banking sector development indicator, which is the ratio of total banking assets to national GDP, ranges from 84 percent to 132 percent. The average real GDP growth rate spans from -2.09 to 8.98 percent, and the inflation rates ranging from 4.20 to 9.90 percent. The exchange rate fluctuated a lot over the study period, with a standard deviation of 14.22.

Regression Analysis

This study is based on balanced panel data, and hence, panel data regression model has been employed to analyze the primary determinants of financial stability of Nepalese commercial banks. Various statistical tests have been done to determine the best panel regression model among pooled OLS, Fixed Effect Model and Random Effect Model. The "F-test" has been used to investigate fixed effects, whereas Breusch and Pagan's (1980) "Lagrange Multiplier (LM) test" has been used to investigate random effects. The F-test compares the fixed effect model to OLS to assess how much the fixed effect model can enhance goodness-of-fit, whereas the latter compares a random effect model to OLS. To compare the random effect model to its fixed equivalent, the Hausman specification test suggested by Hun (2011) has been employed.

Testing of Fixed Effect and Random Effect

The F-test was used to see if there was a significant fixed group effect, while the Breusch and Pagan Lagrangian multiplier test (LM-test) was used to see if there were any random effects. Table 3 shows the results of the F-test and the LM-test.

Table-3: Testing a Fixed Effect (F-test) and Random Effect (LM-test)

Panel A: Testing of Fixed Effect (F-test)		Panel-B: Testing of Random Effect (LM-test)	
F-statistics	64.17	Wald chi-square	693.64
Prob > F = 0.0000		Prob > chi2 = 0.0000	

Table 3 shows the results of the fixed and random effect tests. The result of the F-test for testing the fixed effect is shown in Panel A, whereas the result of the Breusch and Pagan Lagrangian multiplier test (LM-test) for assessing the random effect is shown in Panel B.

The result of evaluating the fixed effect, i.e. the F-test, is shown in Panel-A, where the F-value is statistically significant because the probability values are less than 0.05. It implies that at least one group/time specific intercept does not equal zero. Therefore, there exists significant fixed effect or a significant increase in goodness-of-fit; and hence, the fixed effect model is better than the pooled OLS.

Similarly, Panel-B shows the results of the Breusch and Pagan Lagrangian multiplier test used to examine the random effect (LM-test). A random effect model investigates how error variances are influenced by group and/or time. Because its probability value is less than 0.05, the Wald chi-square value in the LM-test is statistically significant. It claims that the panel data has a significant random effect, and that the random effect model can handle heterogeneity better than the pooled OLS.

When the F-test favors the fixed effect model and the LM-test favors the random effect model in a panel data model, the proper approach is determined using the Hausman specification test.

Hausman Specification Test

Under this study, F-test suggests that the fixed effect model is better than the pooled OLS, and LM-test suggests that the random effect model is better able to deal with heterogeneity than does the pooled OLS. Now, Hausman specification test has been done to compare between fixed and random effect models. The null hypothesis that the random effect model is preferred over the fixed effect model is tested using the Husman specification test. Table-4 displays the results of the Hausman test.

Table-4: Hausman Specification Test

Hausman Specification Test	
Chi square	33.19
Prob> Chi square = 0.0003	
FEM is appropriate	

Table 4 shows the results of the Hausman specification test to determine whether to use a fixed effect or random effect model. The null hypothesis that the random effect model is preferred over the fixed effect model is tested by the Husman specification test. As per the result of Hausman Specification test, chi square value is 33.19, which is statistically significant at the 5% level of significance. Therefore, the Fixed Effect Model appears to be more appropriate than the Random Effect Model. So, the panel data in this study has been analyzed by using a fixed effect model.

Model estimation (Fixed Effect model)

As the Hausman Specification test suggest the Fixed Effect Model (FEM) is appropriate for panel data used in this study, FEM estimation has been conducted. The findings of the FEM estimation are summarized in Table 5.

Table-5: Model estimation results summary

Z-score	Coef.	Std. Err.	t-value	P>t
BE	0.1511110	0.0507678	2.98	**0.003**
ROA	-0.0133345	0.0051066	-2.61	**0.010**
Size	0.0315732	0.0219922	1.44	0.153
CAP	0.0140987	0.0017905	7.87	**0.000**
LLP	0.0024582	0.0029891	0.82	0.412
CONC	0.2943235	0.6732535	0.44	0.662
BSD	0.1785199	0.0770184	2.32	**0.022**
GDP Growth	0.0028714	0.0014783	1.94	**0.050**
INF	0.0126174	0.0034747	3.63	**0.000**
EXR	0.0044525	0.0011924	3.73	**0.000**
Intercept (baseline)	-1.2693790	0.3356123	-3.78	0.000
F-test (model)	26.49	Prob > F = 0.000		
Degrees of freedom	190			
SSM (model)	1.91159098			
SSE (error/residual)	0.472874891			
Root MSE (SEE)	0.04989			

R-square	0.8017			
Adjusted R-square	0.7714			

As per the result of model estimation presented in Table 5, F-test (model) is statistically significant (i.e. Prob > F = 0.0000) showing that the goodness of model is statistically significant. Further, adjusted R-square value of 0.7714 advocate that 77.14 percent variation in bank stability (measured by Z-score) is explained by the internal and external factors included in this study.

The results of model estimation suggest that, among the internal components studied, bank efficiency (BE), profitability (ROA), and capital (CAP) have a substantial impact on bank stability. The coefficient of bank efficiency and capital are positive, indicating that higher bank efficiency and capital base ensures Nepalese commercial banks' financial stability. This contradicts the findings of Ngaira & Miroga (2018), who found a strong negative impact of operational costs on financial stability, and Tan & Floros (2013), who found a significant negative link between bank capitalization and stability. However, the direction of bank profitability appears to be negative, implying that greater bank profitability weakens bank financial stability. This conclusion supports the findings of Tan & Anchor (2016), however it contradicts the result of Klaas & Vagizova (2014), which claim that the stability of the bank is enhanced by high profitability.

In contrast, bank size (Size) and loan loss provision (LLP) appear to have a statistically minimal impact on financial stability of banks. This suggests that the total assets and loan loss provision of a bank are meaningless in establishing the financial stability of a Nepalese commercial bank. This result agrees with the result of Altaee et al. (2013) but it cannot confirm the findings of Farina et al. (2019), de Haan & Poghosyan (2012), Adusei (2015), Ngaira & Miroga (2018), and others who claim the significant positive influence of bank size on financial stability of commercial banks i.e. concentration-stability view nor the result of Köhler (2015) i.e. concentration-fragility view.

Further, the result of model estimation reveal that the financial stability of Nepalese commercial bank is substantially influenced by all the external factors included in this study except by the concentration ratio. According to the findings, the banking sector development (BSD), real GDP growth (GDP growth), inflation rate (INF), and exchange rate (EXR) all have a substantial impact on bank financial stability. Increased banking sector development, stronger real GDP growth, high inflation, and a high exchange rate contribute to improve the stability and financial soundness of Nepalese commercial banks. The impact of inflation on bank stability is refuted but the impact of GDP growth with bank stability is in line with the result of Ozili (2018),

Barik & Pradhan (2021). In contrast, the coefficient value of concentration is insignificant and hence the concentration does not influence the financial stability of Nepalese commercial banks which is in line with the result of IJtsma et al. (2017) but contradict with the result of Uhde & Heimeshoff (2009) which shows the negative impact of concentration in bank stability.

Conclusion and implication

The findings of this study show that bank efficiency, profitability, and capital base are important internal variables, whereas banking sector development, GDP growth, inflation, and exchange rate are important external factors that influence the financial stability of Nepalese commercial banks. Furthermore, bank size, loan loss provision, and bank concentration have negligible influences on Nepalese commercial banks' financial stability.

This research was undertaken within the constraints of several parts of the investigation. This study's sample and study period were chosen for the sake of convenience. Furthermore, additional diagnostic tests have not been tried, despite the research focusing mostly on panel data analysis.

The findings of the study have several implications for banking stakeholders such as bank management and regulators. Bank management is always intended to improve the bank's financial stability, but cannot be concentrated on the primary factors that determine the financial stability. In this regard, this study can guide the bank management for enhancing the financial stability of bank. Further, for the policymakers or regulators, banking stability is an absence of banking crises. The goal of the banking regulator is to stabilize the whole banking industry, which includes the financial stability of individual banks.

Regulators create banking statutes, rules, guidelines, and directives in order to improve financial stability, yet primary factors that affect bank’s financial stability are ignored. As a result, bank management, policymakers, regulators, and other stakeholders of Nepalese commercial banks should develop long-term strategies focusing on key determinants of financial stability in the order of their impact, such as bank efficiency, profitability, capital base, banking sector development, GDP growth, inflation rate, and exchange rate.

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