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The Effect of Interest Rate Spread on the Profitability of Nepalese Commercial Banks

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Abstract

This study examines the impact of the interest rate spread on the profitability of Nepalese commercial banks by using the data from mid-July 2011/12 to 2020/21.This study employs a quantitative approach to examine the effect on twenty-six commercial banks. The results show that interest rate spread positively affects firm performance. One percentage increase in interest rate spread increases return on assets by 0.137%, return on equity by 1.37%, and earnings per share by 8.11%.

Keywords: Interest rate spread, ROA, ROE, EPS & Commercial banks.

1. Introduction

Banks and financial institutions play a significant role in a nation's sustainable growth and development.Nepalese banking industry has grown extensively over the decade.This phenomenal growth rate has led to growth in the country's gross domestic product.As the number of financial institutions increases, the pressure on these institutions also increases in terms of short-term and long-term solvency problems. This increased pressure normally expresses itself through lower profitability (Malik, 2014; Ngure, 2014). Commercial banks have two types of funds: capital funds and debt funds. To collect debt funds, banks pay interest to lenders. When banks face liquidity problems, they must pay high- interest rates to attract deposits and borrowing. This high cost of the fund also increases the base rate, thereby affecting the lending rate.This paper uses interest rate spread to examine the effect on the profitability of Nepalese commercial banks.

2. Literature Review

Numerous empirical studies have examined the interest rate changes in the profitability of commercial banks. Net interest income is the primary source of revenue that comes from the difference in interest incomes and interest expenses of commercial banks. A decrease in interest rates favors customers because they have to pay lower rates for loans and advances.

A decrease in interest rates means a decrease in the cost of deposits and borrowing, resulting in the diversification of the profit of investments.

Kosmidou (2008) explored determinants of profitability of twenty-three Greek banks during the period of E.U. financial integration from 1990-2002 using an unbalanced pooled time series dataset and concluded that interest rate spread has no significant relationship with bank profitability.Mujer and Younes (2009) examined the effect of interest rate spread using panel data of 48 banks from 2004 to 2008 and found that the higher the noninterest income as a ratio of assets, the lowers its spread. Daley and Dacosta (2012) examined the effect on the market interest rate and profitability of two commercial banks in Jamaica from 2000 to 2008 and reported that the market interest rate on treasury bills has a negligible effect on bank profitability. However, the volatility of interest rates has a minimal negative effect on profitability. Irungu (2013) examined forty-three commercial banks operating in Kenya from 2011 to 2013 and concluded that interest rate spread has a strong positive relationship with financial performance. Raza et al. (2013) studied the determinants of bank profitability in Pakistan on 18 sample banks from 2001 to 2010 using the random effect model. They concluded that banks' profitability has adverse and significant effects on bank size, credit risk, liquidity, taxation, and nontraditional activities but positive and significant effects on capitalization, banking sector development, and inflation.

Khan and Sattar (2014) examined the impact of the interest rate change on the profitability of four central commercial banks in Pakistan from 2008 to 2012 by using the Pearson correlation method and found that interest rate has a strong and positive correlation with profitability. Malik et al.(2014) studied the effect of bank lending interest rates on banks' profitability in Pakistan by using a regression model. The authors reported that private banks' lending rate has more impact on ROA and ROE than public sector banks. Ngure (2014) studied the effect of interest rates on the financial performance of forty-four commercial banks in Kenya from 2009 to 2013 by using descriptive research design and explored that interest rates have a significant positive impact on the financial performance of banks. Genay and Podjasek (2014) reported that a low-interest rate environment is related to a profitability decrease in small institutions, but low-interest rates boost economic activity.

Obidike et al.(2015) reported the impact of interest rate spread on the performance of the Nigerian banking industry from 1986 to 2012 by using the OLS method and report that interest rate spread negatively and significantly impacts bank performance in the long run. Gambari and Mwangi (2017) researched over 43 commercial banks in Kenya from 2002 to 2014. They concluded that the lending interest rate ratio has a significant positive relationship with financial performance, but the deposit interest rate negatively impacts financial performance. Minny and gormus (2017) studied the relationship between interest rate changes and the profitability of three participating banks in Turkey from 2008 to 2016. The research found that interest rate changes have a significantly positive impact on profitability.

Ahmed et al. (2018) researched twenty commercial banks in Pakistan from 2007 to 2014. They reported that deposits with other banks and interest rates hurt profitability, but

advances, loans, and investments positively impact profitability.Bikker and Vervliet (2018) researched twenty-four commercial banks in Ghana for ten years and reported that interest rate spread has a positive and statistically significant impact on profitability. Noreen et al.(2018) examined the impact of interest rates on banks' profitability from 2007 to 2018 over four commercial banks in Pakistan and explored that interest rates has a significant positive relationship with banks' profitability.

Musah et al. (2018) studied twenty-four commercial banks in Ghana from 2003 to 2016 using panel data and exploring the interest rate spread. Banks' profitability(ROA and ROE) have a positive and statistically significant relationship.Karki (2020) examined only one commercial bank in Nepal from the fiscal year 2066/67 to 2075/76 B.S. and reported that interest rate spread positively impacts the profitability of Nepal's investment bank. Jui et al.(2020) researched over 30 commercial banks in Bangladesh from 2014 to 2018, and they reported that interest rate spread positively impacts profitability (ROA, ROE, and NIM).Ullah and Khan (2021) evaluated the impact of interest rate spread and other bank-specific variables on the profitability (ROA) of forty commercial banks in Pakistan from 2006 to 2015 by using unbalanced panel data and conclude that IRS has a positive and significant impact on ROA.

From the empirical literature review, the researcher found mixed results on behalf of interest rate spread and its impact on profitability. Studies by Irungu (2013); Ngure (2014); Wambari and Mwangi (2017); Bikker and Vervliet (2018); Musah et al. (2018), Karki (2020), Jui et al.(2020) and Ullah and Khan (2021) found interest rate spread has strong positive and significant relationship on financial performance. However, Obidike et al.(2015)mentioned that interest rate spreadnegatively and significantly impacts bank performance in the long run. Similarly, Khan and Sattar (2014) and Ngure (2014) found that interest rate has a strong and positive impact on profitability.Likewise, Minny and gormus (2017) and Noreen et al.(2018) found that interest rate changes positively impact profitability. However, Ahmed et al. (2018) found that interest rates hurt profitability.

Description of variables

Dependent variables

This study uses three measures of firm performance: Return on Assets (ROA), Return on Equity(ROE), and Earnings Per Share(EPS).

Independent variables

This study uses Interest Rate Spread (IRS) as the leading independent variable. IRS is calculated as the difference between a bank's lending interest rate and deposit interest rate.

Control variables:

For controlling other determinant of firm performance, this study uses Capital Adequacy Ratio(CAR), Total Deposit to Total Assets (TDTA), Shareholders Equity to Total Assets (SETA), Total Deposit to Shareholders Fund(TDSF), Total Lending to Total Assets (TLTA), and Net Interest Income to Total Assets (NIM) as control variables.

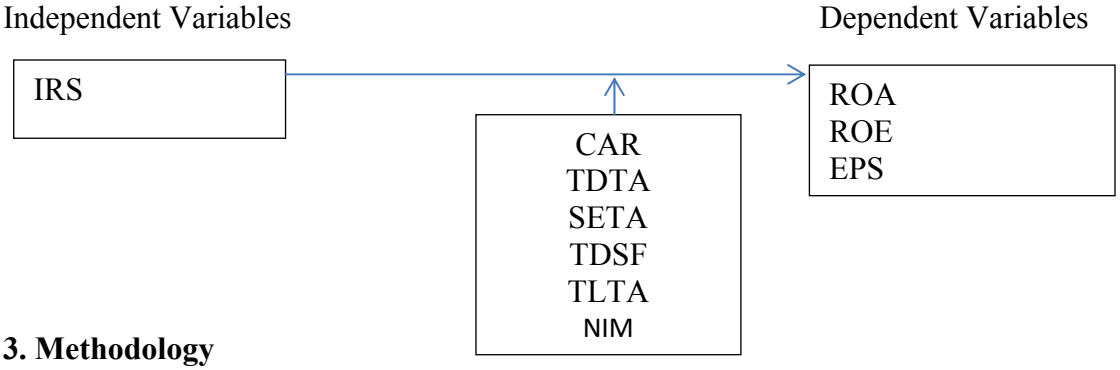
Table 1

Variables Description

Variables	Description
Dependent:	
ROA	Return on assets is the ratio of net profit after tax to total assets.
ROE	Return on equity is the ratio of net profit after tax to shareholders' equity.
EPS	Earnings per share are the ratio of net profit after tax to total outstanding shares.
Independent:	
IRS	The interest rate spread is the difference between a bank's lending and deposit rates.
Control variables:	
CAR	The capital adequacy ratio is the ratio of capital funds to risk-weighted assets.
TDTA	Total deposit to total assets
SETA	Shareholders' equity to total assets
TDSF	Total deposit to shareholders' fund
TLTA	Lending to total assets
NIM	Net interest income to total assets

Source: Author (self)

Conceptual framework



3. Methodology

The objective of this study is to determine the impact of interest rate changes on the profitability of commercial banks. To do so, this paper uses financial information data collected from annual reports published on company websites. The sample period is from mid-July 2011/12 to 2020/21. The sample includes twenty-six commercial banks except for Rastriya Banijya Bank. The government of Nepal fully owns Rastriya Banijya Bank and thus heavily influences the management. Therefore, it is excluded from the sample banks.All sample banks are listed in Appendix 1.

This research uses a quantitative research method for its analysis. Descriptive statistics are reported, and panel data regression models examine the relationship between IRS and profitability.

Empirical Model:

First Model

$$ROA_{it} = \beta_0 + \beta_1 IRS_{it} + \beta_2 CAR_{it} + \beta_3 TDTA_{it} + \beta_4 SETA_{it} + \beta_5 TDSE_{it} + \beta_6 TLTA_{it} + \beta_7 NIM_{it} + \epsilon_{it} \quad (1)$$

Second Model

$$ROE_{it} = \beta_0 + \beta_1 IRS_{it} + \beta_2 CAR_{it} + \beta_3 TDTA_{it} + \beta_4 SETA_{it} + \beta_5 TDSE_{it} + \beta_6 TLTA_{it} + \beta_7 NIM_{it} + \epsilon_{it} \quad (2)$$

Third Model

$$EPS_{it} = \beta_0 + \beta_1 IRS_{it} + \beta_2 CAR_{it} + \beta_3 TDTA_{it} + \beta_4 SETA_{it} + \beta_5 TDSE_{it} + \beta_6 TLTA_{it} + \beta_7 NIM_{it} + \epsilon_{it} \quad (3)$$

4. Results and Findings

4.1 Descriptive Statistics

Table 2

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	260	1.504	0.740	-3.430	4.010
ROE	260	14.231	9.499	-56.479	86.099
EPS	260	26.005	20.181	-40.230	198.53
IRS	260	4.186	0.809	2.490	7.320
CAR	260	13.168	2.821	-5.820	22.99
TDTA	260	0.845	0.069	0.660	1.495
SETA	260	0.111	0.060	-0.073	0.930
TDSF	260	8.341	5.645	-17.766	83.263
TLTA	260	0.694	0.080	0.426	1.165
NIM	260	3.281	1.084	1.72	9.091

ROA

Profitability measures a bank's degree of operating success in a defined period, which shows the ability to use resources for revenue generation over its expenses. ROA measures how effectively and efficiently commercial banks use their assets to generate profit. Over the study period of 2011/12 to 2020/21, there was an average ROA of 1.504%, with standard deviation of 0.74. The maximum value of ROA was 4.01%, and the minimum value was –3.43%. This result shows a high fluctuation in ROA during the study period. Based on the data, it is concluded that Nepalese commercial banks have no constancy in utilizing their available assets to earn income.

ROE

ROE measures how effectively and efficiently banks use their equity to generate profit, and it is the relationship between net income after tax to shareholders' equity. Over the study period of 2011/12 to 2020/21, there was an average ROE of 14.231%, with standard deviation of 9.499. The maximum value of ROE was 86.099%, and the minimum was -56.479%. This result shows that there is a high fluctuation in ROE during the study

period.Based on the data, we conclude that Nepalese commercial banks have no constancy in utilizing their available capital to earn income.

EPS

EPS measures how effectively and efficiently banks are earned in total outstanding shares. Over the study period of 2011/12 to 2020/21, there was an average EPS of 26, with standard deviation of 20. The maximum value of EPS wasNRs 198.53, and the minimum was NRs -40.23. This result shows a high fluctuation in EPS during the study period. Based on the data, we conclude that Nepalese commercial banks have no constancy in net income after tax.

IRS

IRS is the difference between the bank lending rate and the bank deposit rate. Over the study period of 2011/12 to 2020/21, there was an average IRS of 4.186%, with standard deviation of 0.81. The maximum value of the IRS was 7.32%, and the minimum value was 2.49%. This result shows a high fluctuation in IRS during the study period. Based on the data, we conclude that Nepalese commercial banks have no constancy in lending and bank deposit interest rates.

CAR

A high capital adequacy ratio(CAR) means high financial strength, but a very high CAR indicates an inability to utilize its capital. Banks must maintain CAR as stipulated by the norms of NRB from time to time, and commercial banks must maintain 11 percent CAR as per the latest NRB norms. Over the study period of 2011/12 to 2020/21, there was an average CAR of 13.168%, with standard deviation of 2.82. The maximum value of CAR was 22.99%, and the minimum value was -5.82%. This result shows a high fluctuation in CAR during the study period. Based on the data, we conclude that Nepalese commercial banks have no constancy in CAR.

TDTA

TDTA is the relationship between Total Deposits and Total Assets, which shows how effectively organizations utilize their total assets to collect deposits. Over the study period of 2011/12 to 2020/21, there was an average TDTA of 0.645, with standard deviation of 0.069. The maximum value of TDTA was 1.495, and the minimum value was 0.66. This result shows a high fluctuation in TDTA during the study period. Based on the data, we conclude that Nepalese commercial banks have not been able to utilize their assets properly to collect a deposit.

SETA

SETA is the relationship between Shareholders' Equity to Total Assets. Over the study period of 2011/12 to 2020/21, there was an average SETA of 11.1%, with standard deviation of 0.06. The maximum value of SETA was 93%, and the minimum value was -7.3%. This result shows a high fluctuation in SETA during the study period. Based on the data, we conclude that Nepalese commercial banks have not been able to increase their shareholders equity compared to total assets.

TDSF

TDSF is the ratio between Total Deposit to ShareholdersFund, which shows how effectively organizations utilize their capital fund to collect a deposit. Over the study period of 2011/12

to 2020/21, there was an average TDSF of 8.341, with standard deviation of 5.645. The maximum value ofTDSF was 83.263 times, and the minimum was -17.766 times. This result shows a high fluctuation in TDSF during the study period. Based on the data, we conclude that Nepalese commercial banks have not been able to increase their total deposit compared to shareholders equity.

TLTA

TLTA is the ratio between Total Loan and advance to Total Assets, which shows how effectively organizations utilize their Total Assets for Lending. Over the study period of 2011/12 to 2020/21, there was an average TLTA of 69.4%, with standard deviation of 0.08.The maximum value ofTLTA was 1.165 times, and the minimum value was 0.426 times. This result shows a high fluctuation in TLTA during the study period. Based on the data, we conclude that Nepalese commercial banks have not been able to utilize their assets properly for lending.

NIM

NIM is the relationship between Net interest income to Total Assets, which shows how effectively organizations utilize their Total Assets to generate income. Over the study period of 2011/12 to 2020/21, there was an average NIM of 3.281%, with standard deviation of 1.084.The maximum value ofNIM was 9.091%, and the minimum value was 1.72%. This result shows a high fluctuation in NIM during the study period. Based on the data, we conclude that Nepalese commercial banks have not been able to utilize their assets properly to generate income.

4.2 Matrix of correlations

Table 3

Matrix of correlations

Matrix of correlations

Variables	ROA	ROE	EPS	IRS	CAR	TDTA	SETA	TDSF	TLTA	NIM
ROA	1.000									
ROE	0.695	1.000								
EPS	0.603	0.430	1.000							
IRS	0.351	0.237	0.504	1.000						
CAR	0.124	-0.048	-0.241	-0.197	1.000					
TDTA	-0.104	0.024	0.039	0.037	-0.379	1.000				
SETA	0.092	-0.057	-0.171	-0.163	0.424	-0.195	1.000			
TDSF	-0.096	0.526	-0.139	0.009	-0.206	0.217	-0.160	1.000		
TLTA	-0.151	-0.182	-0.340	-0.220	0.097	0.339	0.173	-0.074	1.000	
NIM	0.510	0.257	0.322	0.477	0.074	0.039	0.090	-0.054	-0.017	1.000

The correlation analysis shows that TDTA, TDSF, and TLTA negatively correlate with ROA. It indicates that when TDTA, TDSF, and TLTA decrease, the value of ROA increases and vice versa. However, the IRS, CAR, SETA, and NIM have a positive relationship with ROA. It indicates that when IRS, CAR, SETA, and NIM increase, the value of ROA also increases and vice versa.

The correlation analysis shows that CAR, SETA, and TLTA negatively correlate with ROE. It indicates that when CAR, SETA, and TLTA decrease, the value of ROE increases and vice versa. However, the IRS, TDTA, TDSF, and NIM positively correlate with ROE. It indicates that when IRS, TDTA, TDSF, and NIM increase, the value of ROE also increases and vice versa.

The correlation analysis shows that CAR, SETA, TDSF, and TLTA negatively correlate with EPS. It indicates that when CAR, SETA, TDSF, and TLTA decrease, the value of EPS increases and vice versa. However, the IRS, TDTA, and NIM positively correlate with EPS. It indicates that when IRS, TDTA, and NIM increase, the value of EPS also increases and vice versa.

4.3 Linear regression

Table 4

Linear regression

ROA	Coef.	St.Err.	T-stats	P-value	[95% Conf Interval]		Sig
IRS	.137	.058	2.35	.02	.022	.252	**
CAR	.024	.017	1.45	.148	-.009	.057	
TDTA	-.316	.685	-0.46	.645	-1.664	1.033	
SETA	.573	.734	0.78	.436	-.872	2.017	
TDSF	-.007	.007	-0.93	.352	-.021	.007	
TLTA	-1.12	.554	-2.02	.044	-2.211	-.029	**
NIM	.29	.042	6.89	0	.207	.373	***
Constant	.699	.692	1.01	.314	-.665	2.063	
Mean dependent var		1.504	SD dependent var			0.740	
R-squared		0.311	Number of obs			260	
F-test		16.262	Prob > F			0.000	

Notes: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable ROA

The adjusted R-squared statistics of the model is 31.1%. The result indicates that the changes in the independent variables IRS explain 31.1 % of the changes in the dependent variable ROA. Other determinants explain the remaining 68.9 % of changes in ROA. This analysis shows that IRS has a statistically significant relationship with ROA at 5% significance. As in previousstudies, the results of IRS have a positive and statistically significant impact on ROA,consistent with Ullah and Khan (2021).CAR, SETA, and NIM positively correlate with ROA among the controllable variables. NIM is statistically significant at 1% significance level, but CAR and SETA are statistically insignificant. The study's results indicate that a 1% increase in NIM increases the growth in ROA by 0.29%. TDTA, TDSF, and TLTA have negative correlations and are statistically significant at 5%, except for TDTA and TDSF. The study results indicate that a 1% increase in TLTA reduces the growth in ROA by 1.12%.

Table 5

Linear regression

ROE	Coef.	St.Err.	T-stats	P-value	[95% Conf Interval]		Sig
IRS	1.373	.703	1.95	.052	-.012	2.757	*
CAR	.196	.201	0.98	.33	-.2	.592	
TDTA	-6.928	8.256	-0.84	.402	-23.188	9.333	
SETA	2.148	8.848	0.24	.808	-15.276	19.573	
TDSF	.934	.087	10.80	0	.764	1.104	***
TLTA	-12.052	6.682	-1.80	.072	-25.212	1.107	*
NIM	1.985	.507	3.91	0	.986	2.985	***
Constant	5.579	8.351	0.67	.505	-10.867	22.025	
Mean dependent var		14.231	SD dependent var				9.499
R-squared		0.392	Number of obs				260
F-test		23.211	Prob > F				0.000

Notes: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable ROE

The adjusted R-squared statistics of the model is 39.2 %. The result indicates that the changes in the independent variables explain 39.2 % of the dependent variable ROE, and other determinants explain the remaining 60.8 % of changes in ROE. This analysis shows that IRS has a statistically significant relationship with ROE at the 10% significance level, and a one percent increase in IRS increases ROE by 1.3%.

Among controllable variables, CAR, SETA, TDSF, and NIM have a positive correlation with ROE. TDSF and NIM are statistically significant at 1% level of significance. The study's results indicate that a 1% increase in TDSF and NIM increases the growth in ROE by 0.934% and 1.985%, respectively. TDTA and TLTA have a negative correlation and are statistically significant at 10% level of significance with ROE, but TDTA is statistically insignificant. The study's results indicate that a 1% increase in TLTA reduces the growth in ROE by 12.052%.

Table 6

Linear regression

EPS	Coef.	St.Err.	T-stats	P-value	[95% ConfInterval]		Sig
IRS	8.111	1.493	5.43	0	5.169	11.052	***
CAR	-1.079	.427	-2.53	.012	-1.92	-.238	**
TDTA	30.75	17.539	1.75	.081	-3.791	65.291	*
SETA	-10.458	18.794	-0.56	.578	-47.472	26.556	
TDSF	-.765	.184	-4.16	0	-1.126	-.403	***
TLTA	-74.749	14.194	-5.27	0	-102.704	-46.795	***
NIM	2.987	1.078	2.77	.006	.864	5.11	***
Constant	29.939	17.739	1.69	.093	-4.997	64.876	
Mean dependent var		26.005	SD dependent var				20.181
R-squared		0.392	Number of obs				260
F-test		23.231	Prob > F				0.000

Notes: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable EPS

The adjusted R-squared statistics of the model is 39.2 %. The result indicates that the changes in the independent variables explain 39.2 % of the dependent variable EPS. Other determinants explain the remaining 60.8 % of changes in EPS.This analysis shows that IRS has a statistically significant relation with EPS at 1% level of significance. Among controllable variables, TDTA and NIM have a positive correlation with EPS. TDTA is statistically significant at 10%. Likewise, NIM is statistically significant at 1%. CAR, SETA, TDSF, and TLTA have a negative correlation.CAR is statistically significant at 5%. Furthermore, TDSF and TLTA have statistically significant at 1% with EPS, but SETA is statistically insignificant.

The findings of IRS having a statistically significant positive relation with ROA, ROE, and EPS are consistent with the previous findings of Irungu (2013); Ngure (2014); Wambari and Mwangi (2017); Bikker and Vervliet (2018); Musah et al. (2018), Karki (2020) and Jui et al.(2020). On the contrary, Obidike et al. (2015) mentioned that interest rate spread negatively and significantly impacts bank performance in the long run.

5. Conclusion

This study examines the effect of interest rate spread on firm performance. Using a sample of twenty-six Nepalese commercial banks from 2011/12 to 2020/21, this paper finds that interest rate spread significantly affects firm performance. One percentage increase in interest rate spread increases return on assets by 0.137%, return on equity by 1.373%, and earnings per share by 8.111%. Since interest rate spread is an essential determinant of banks' profitability, bank management and shareholders should continuously monitor the indicator.

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Appendix 1: List of sample banks

S.N.	Name of Commercial Banks	S.N.	Name of Commercial Banks
1	Bank of Kathmandu Ltd	14	NMB Bank Ltd
2	Civil Bank Ltd	15	Nepal SBI Bank Ltd
3	Citizen Banks International Ltd	16	Nepal Investment Bank Ltd
4	Century Commercial Bank Ltd	17	Nepal Bangladesh Bank Ltd
5	Everest Bank Ltd	18	NIC ASIA Bank Ltd
6	Global IME Bank Ltd	19	NCC Bank Ltd
7	Himalayan Bank Ltd	20	Prabhu Bank Ltd
8	Kumari Bank Ltd	21	Prime Commercial Bank Ltd
9	Laxmi Bank Ltd	22	Siddhartha Bank Ltd
10	Machhapuchhre Bank Ltd	23	Sunrise Bank Ltd
11	Mega Bank Nepal Ltd	24	Standard Chartered Bank Ltd
2	Nabil Bank Ltd	25	Sanima Bank Ltd
13	Nepal Bank Ltd	26	Agriculture Development Bank