Effects of Interest Rate, Exchange Rate and their Volatilities on Stock Price of Nepalese Commercial Banks

Manoj Shrestha*

Abstract

This study examines the effects of interest rate, exchange rate and their volatilities on stock price of Nepalese commercial banks. Stock price and stock return are the selected dependent variables. The selected independent variables are bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate. The study is based on secondary data of 14 commercial banks with 140 observations for the study period from 2013/14 to 2022/23. The data were collected from Banking and Financial Statistics published by Nepal Rastra Bank, reports published by Ministry of Finance and annual report of respective commercial banks and NEPSE. The correlation coefficients and regression models are estimated to test the significance and importance of bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate on stock price of Nepalese commercial banks.

The result showed that bank rate has a positive effect on stock price and stock return. It means that increase in bank rate leads to increase in stock price and stock return. Likewise, deposit interest rate has a negative effect on stock price and stock return. It means that increase in deposit interest rate leads to decrease in stock price and stock return. Similarly, lending interest rate has a negative impact on stock price and stock return. It shows that higher the lending interest rate, lower would be the stock price and stock return. Additionally, base rate has a negative effect on stock price and stock return. It indicates that increase in base rate leads to decrease in stock price and stock return. However, volatility of interest rate has a negative effect on stock price and stock return. It indicates that increase in volatility of interest rate leads to decrease in stock price and stock return. Further, this study showed that exchange rate has a negative effect on stock price and stock return. It means that higher the exchange rate, lower would be the stock price and stock return.

Keywords: bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate, exchange rate

1. Introduction

A country's economy is typically measured using the stock market index. The stock market in any nation is essential for economic prosperity. However,

* Mr. Shrestha is a Freelance Researcher, Kathmandu, Nepal. E-mail: manojstha1328@gmail.com

there are numerous factors that do affect the stock market. These elements could improve or worsen performance. The stock market index is always a cause for alarm, even when it rises quickly. The relationships between stock market capitalization rate and interest rate have preoccupied the minds of economists since they both play important roles in influencing a country's economic development (Aydemir and Demirhan, 2009). Stock exchanges are entities that provide dealing amenities for stock negotiators and dealers, to buy and sell stock and other securities (Ali, 2014). Growth in the stock index is typically viewed as a positive indicator because it shows that investors are optimistic about the economy's prospects going forward. Stock market plays a significant role in the economy of a country and important role in the allocation of resources, both directly as a source of funds and as a determinant of firms' value and its borrowing capacity. Stocks have always been a hot topic of discussion in the financial realm, but the difficulty in understanding the real meaning of stocks still persists.

Amollo and Ndede (2023) investigated the relationship between central bank announcements of changes in rates and stock market returns of selected firms listed at the Nairobi Securities Exchange. The study showed that fixed central bank rate has no significant impact on stock returns. The study concluded that upward revision of central bank rate negatively impacted the stock returns of firms listed at NSE. The fixed central bank rate has no significant impact on stock returns. Majid and Yusof (2009) determined the extent to which macroeconomic variables influence the Islamic stock market in Malaysia. Using the autoregressive distributed lag (ARDL) approach, the study found a positive relationship between interest rates and Islamic stock prices. Uddin and Alam (2010) explored the impact of interest rates on the stock market of Dhaka Stock Exchange. The results showed that the current interest rate and stock price have a negative connection is not refuted. The study also showed that Dhaka Stock Exchange will greatly benefit if interest rates are significantly managed in Bangladesh through supply and demand, pulling more investors into the stock market and corporations into expanding their investments. Cheah *et al.* (2017) examined the relation between stock prices and exchange rates in Malaysia using monthly observations from 1993 to 2015. The estimated NARDL models suggest that exchange rate movements have significant short-run and long-run effects on stock prices in Malaysia. Similarly, the stock market responds asymmetrically against currency appreciation and depreciation. In addition, Singh (2015) investigated the relationships between the exchange rate and stock price over the period January 2007 to March 2014. The analysis revealed that exchange rate and stock price are co-integrated and, hence, a long-run equilibrium

relationship exists between them. The exchange rate is found to be significant in determining stock price and stock price significantly affects exchange rate.

Interest rate has a more direct effect on financial market. An increase in interest rate leads investing decisions to make a change in the structure of investment, generally from capital market to fixed income securities. Variability in interest rates directly generates a momentum to the money market from capital market. The stocks are sensitive to interest rates, as the changes in interest rates are inversely related to stocks (Alam and Uddin, 2009). Theoretically, the relation between exchange rate and stocks can be postulated as either positive (currency depreciation makes local firms more competitive, leading to an increase in exports as a result stocks prices increase), or negative (if the production is dependent on imported input, cost of production would rise as a result of currency depreciation, thus reducing profitability and a resulting decline in stocks returns), and a weak or no relation (an export oriented firm's prices rises with currency depreciation, since the input cost is also affected by this currency depreciation than the effect would be nullified to some extent because of increased cost of production). Beirne et al. (2009) analyzed the relationship between macroeconomic variables and stock returns in three financial sectors i.e., banking, financial services and insurance in 16 different countries. The results showed a negative significant effect of interest rate, while exchange rate showed a mixed significant effect with stock prices. Alam (2020) found that money supply has a positive association with stock market return. According to Bhattacharjee and Das (2021), there is a positive and significant relationship between money supply and stock return. Jawaid and Ul Haq (2012) investigated the effects of exchange rate, interest rates, and their volatilities on stock prices of banking industry of Pakistan. Cointegration results suggested the existence of significant negative long run relationship between exchange rate and short-term interest rate with stock prices. On the other hand, positive and significant relationship exists between volatilities of exchange rate and interest rate with stock prices. Similarly, causality analysis confirmed bidirectional causality between exchange rate and stock prices. However, unidirectional causality runs from short term interest rate to stock prices. Sensitivity analysis confirmed that the results are robust. The result also supported the view that exchange rate and interest rate can be used as an indicator for investment decision making in banking sector stocks.

Sururi *et al.* (2021) revealed that there is a significant positive association between firm size and stock prices. Hyde (2007) explored the sensitivity of stock returns of 33 industry portfolios of four European economies to exchange rate, interest rate and market risk. The results revealed that both exchange rate and market risks are significant and positive for all four economies, while

interest rate risk is positively significant for France and Germany. Further, decomposition of the risks showed that news relating to future dividends, real interest rates and excess returns are the main determinants. Vardar et al. (2008) analyzed the impact of interest rates and exchange rate on volatility of different sectors (financial, industrial, services and technology) and composite indices in Istanbul stock exchange. The results showed strong power of prediction of the two variables on the volatility of the composite index. Specifically, exchange rate changes are strongly predictive for all the indices except technology index. Moreover, interest rate volatility showed significant positive relationship with all indices except services sector, which shows a negative relationship. The study suggested that investors should follow the monetary policies in order to effectively manage risk while taking investment decision in these sectors. Vaz et al. (2008) examined the changes in interest rates on stocks returns of major Australian banks during the period from 1990 to 2005. The results showed no negative impact on Australian banks stock returns after announced increased in interest rates, in comparison to banks in US, where a negative impact is observed with an increase interest rate. Moreover, there is a net positive abnormal return in the event of cash rate increase. The study also concluded that Australian banks working in less competitive and concentrated environment are able to advantageously. Lobo (2002) examined the impact of unexpected changes in the federal funds target on stock prices. The study analyzed the data and changed in the federal funds rate target of Bonser-Neal from January 1988 to January 2001 on the conditional mean and variance of stock prices. the study revealed that stock values are affected by interest rate surprises on the day of the announcement. In addition, assessments of the effect of target changes on stock prices are more precisely produced by surprises that are built from survey replies.

In the context of Nepal, Khatri (2019) investigated the dynamic relationship among the stock market and macroeconomic factors like inflation, interest rate, money supply, GDP, exchange rate and foreign direct investment in Nepal. The findings revealed that the stock price was positively and significantly related to money supply. Real economic activity and interest rates have an insignificant and negative relationship with stock price. Lamichhane and Kulshrestha (2022) examined the factors influencing the performance of Nepalese stock market. The study demonstrated that remittances and money supply positively affect the stock markets, whereas interest rate and exchange rate negatively affect stock market performance. Acharya and Pradhan (2019) assessed the effect of firm specific and macro-economic variable on share price determination of commercial banks in Nepal. The result showed that beta coefficients for earning per share, dividend per share, gross domestic

product, and inflation on market price of share whereas, negative for firm size, return on assets and interest rate. Gautam and Bista (2019) examined the factors affecting the share price of Nepalese insurance companies. The result showed that firm specific variables like earnings per share, divided per share, price earnings ratio, book value per share, return on assets and size are the major determining stock price in context of insurance companies in Nepal. Among the variables, size is found to be the most important determining variable that affects the share price. Among the macro-economic variables such as gross domestic product, inflation and money supply, gross domestic product is a major variable that affect the share price.

The above discussion shows that empirical evidences vary greatly across the studies on the effects of interest rate, exchange rate and their volatilities on stock price. 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 determine the effects of interest rate, exchange rate and their volatilities on stock price of Nepalese commercial banks. Specifically, it examines the relationship of bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate on the stock price and stock return 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.

2. Methodological aspects

The study is based on the secondary data which were gathered from 14 commercial banks for the study period from the 2013/14 to 2022/23, leading to a total of 140 observations. The study employed stratified random sampling method. The main sources of data include Banking and Financial Statistics published by Nepal Rastra Bank, reports published by Ministry of Finance and annual report of respective commercial banks and NEPSE. 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 Nepalese commercial banks selected for the study along with the study period and number of observations

S.N.	Name of the commercial banks	Study period	Observations
1	Nabil Bank Limited	2013/14 - 2022/23	10
2	Standard Chartered Bank Nepal Limited	2013/14 - 2022/23	10
3	Himalayan Bank Limited	2013/14 - 2022/23	10
4	Nepal SBI Bank Limited	2013/14 - 2022/23	10
5	Everest Bank Limited	2013/14 - 2022/23	10
6	NIC Asia Bank Limited	2013/14 - 2022/23	10
7	Machhapuchchhre Bank Limited	2013/14 - 2022/23	10
8	Laxmi Sunrise Bank Limited	2013/14 - 2022/23	10
9	Siddharth Bank Limited	2013/14 - 2022/23	10
10	Citizens Bank International Limited	2013/14 - 2022/23	10
11	Prime Commercial Bank Limited	2013/14 - 2022/23	10
12	NMB Bank Limited	2013/14 - 2022/23	10
13	Prabhu Bank Limited	2013/14 - 2022/23	10
14	Sanima Bank Limited	2013/14 - 2022/23	10
Total number of observations			140

Thus, the study is based on the 140 observations.

The model

The model used in this study assumes that stock price and stock return depend on interest rate and exchange rate volatilities. The dependent variables selected for the study are stock price and stock return. Similarly, the selected independent variables in this study are bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate. Therefore, the models take the following forms:

$$SP = \beta_0 + \beta_1 BR + \beta_2 DIR + \beta_3 LIR + \beta_4 BSR + \beta_5 VIR + \beta_6 EXR + e_{it}$$

$$SR = \beta_0 + \beta_1 BR + \beta_2 DIR + \beta_3 LIR + \beta_4 BSR + \beta_5 VIR + \beta_6 EXR + e_{it}$$

Where,

SP = Stock price as measured by the closing price of the stock, in Rs.

SR = Stock return as measured by the capital gain yield, in percentage.

BR = Bank rate as measured by the cost of return as a percentage of the amount by bank, in percentage.

DIR = Deposit interest rate as measured by the rate paid by banks to the customers, in percentage.

LIR = Lending interest rate as measured by 2.5% addition in base rate, in percentage.

BSR = Base rate as measured by the minimum interest rate set by the central bank below which banks are not permitted to lend, in percentage.

VIR= Volatility of interest rate as measured by the current interest rate minus previous interest rate divided previous interest rate, in percentage.

EXR = Exchange rate, Rs to US Dollar.

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

Bank rate

The interest rate that a central bank assesses on its loans and advances to a commercial bank is known as the bank rate. It is often known as the discount rate. Arango *et al.* (2002) displayed evidence of a nonlinear and negative relationship between share prices on the Bogota stock exchange and bank rate. Vaz *et al.* (2008) examined the effect of interest rates on the stock returns. The study showed that there is a negative relationship between bank rate and stock returns. When central banks raise interest rates (bank rate), borrowing becomes more expensive for businesses and consumers. This can lead to decreased corporate earnings as companies face higher costs for servicing debt. Consequently, investors may perceive these companies as less valuable, leading to a decrease in their stock prices. Al-Shubiri (2010) demonstrated that a tightening of interest rates driven by monetary policy has a negative effect on stock prices. Madura and Schnusenberg (2000) examined the interaction between the bank stock return and the US Federal Reserve discount rate. The study found that bank stock returns and the US Federal Reserve discount rate were negatively related. Based on it, this study develops the following hypothesis:

H_1: There is a negative relationship of bank rate with stock price and stock return.

Deposit interest rate

The average interest rate on retail deposits at each bank is referred to as the deposit interest rate. When deposit interest rates are high, individuals may find it more attractive to save their money in interest-bearing accounts rather than investing in stocks. This can reduce the amount of money flowing into the stock market, leading to lower demand for stocks and potentially lower stock prices. Ben-David *et al.* (2017) examined that bank deposit rates are determined by the supply of deposits by households and firms and the demand for deposits by banks. Individuals migrate their capital from the stock market to the bank as the interest rate given by banks to depositors rises. This will lead to a decline in share demand and a decrease in share price, as well as a negative influence on the stock market and deposit interest rates (Uddin and Alam, 2009). Sun and Wang (2018) found that the interest rate on bank deposits has a negative impact on the stock price. Smith (1984) argued that bank competition for deposits would bid up deposit rates of interest and it has

negative relationship with stock price and stock return. Based on it, this study develops the following hypothesis:

H_2: There is a negative relationship of deposit interest rate with stock price and stock return.

Lending interest rate

Commercial banks are self-contained businesses that establish their own lending rates. When banks lend money to consumers, they charge interest for a variety of reasons, including value preservation, risk compensation, and profit among others (Sheriff and Amoako, 2014). Beck *et al.* (2015) explained that an increase in lending interest rates typically raises the cost of borrowing for businesses. This can lead to higher expenses for companies, reducing their profitability and potentially lowering stock prices. Conversely, a decrease in lending rates can lower borrowing costs for businesses, potentially improving their profitability and supporting higher stock prices. Lashkary *et al.* (2013) examined the correlation between exchange rate volatility, stock price and lending behavior of banking system in Maskan bank during 1991-2011. The study found that lending interest rate of Maskan bank negatively influence the stock price. Huy *et al.* (2020) examined using econometric model of selected factors that have an impact on stock price. The study found that lending rates has negative impact on Sacom Bank's (STB) stock price. Al-Qenac *et al.* (2002) found that lending interest rate affects stock prices significantly and negatively. Changes in bank lending are significant in affecting stock and housing prices. Based on it, this study develops the following hypothesis:

H_3: There is a negative relationship of lending interest rate with stock price and stock return.

Base rate

The minimum interest rate that the central bank of a country sets will not allow banks for lending to their customers. Depending on the credit risk premium, a base rate and an appropriate spread are added to determine the loan pricing. Because commercial banks modify their interest rates in reaction to any changes announced by central banks, the base rate has an impact on the interest rate that clients receive. Commercial banks hike their interest rates in response to a central bank's increase in the base rate, which increases the cost of borrowing. Commercial banks' interest rates will decrease and expenses would probably increase if the base rate declines. Diasakos *et al.* (2015) presented those changes in the European Central Bank's base rate have a significant impact on the profitability and stock price of commercial banks in Greece. Sari and Ergul (2017) assessed the effect of change in the base rate on stock market returns in case of Turkey. The study found that the changes in the base rate had a significant negative impact on the returns

of the Turkish stock market. Erten and Ozturk (2018) found that changes in interest rates have a significant impact on stock market returns in OECD countries. The study found a negative relationship between changes in short-term interest rates and stock market returns. The study also found evidence of a significant lag effect between changes in interest rates and stock market returns. Elsharnouby and Alexandridis (2020) found that changes in the base interest rate have a significant negative impact on stock market returns in the United Kingdom. The study suggested that investors should consider the impact of changes in base interest rate when making investment decisions in the UK stock market. Alqahtani *et al.* (2021) found that changes in the base interest rate have a significant impact on stock market returns in emerging markets. The study analyzed data from six emerging markets and found evidence of a negative relationship between changes in the base interest rate and stock market returns. Based on it, this study develops the following hypothesis:

$H_{4:}$ There is a negative relationship of base rate with stock price and stock return.

Volatility of interest rate

The volatility of interest rates in commercial banks refers to the degree of variation or fluctuation in interest rates over a specific period. Interest rates play a crucial role in the banking sector, influencing the cost of funds, profitability, and the overall financial stability of banks. Ali (2014) revealed that interest rate has a negative impact on stock market, higher the interest rate lowers the efficiency of stock market. Hajilee and Nasser (2017) showed that the relationship between rates of interest volatility and commercial banks financial performance was negative and insignificant. Ryan and Worthington (2004) found that the risk is an important determinant of bank stock returns, along with short- and medium-term interest rate levels and their volatility. However, long-term interest rates and the foreign exchange rate do not appear to be significant factors in the Australian bank return generating process over the period considered. Kasman *et al.* (2011) found that the interest rate has a negative and significant impact on the conditional bank stock return. Similarly, bank stock return sensitivities are found to be stronger for market return than interest rates implying that market return plays an important role in determining the dynamics of conditional return of bank stocks. Nouman *et al.* (2022) revealed that paradoxical as it may seem, the financing of Islamic banks operating within a dual banking system is subject to interest rate risk, mainly due to benchmarking interest rate, the relationship between interest rate and stock returns has negative. Based on it, this study develops the following hypothesis:

H_5: There is a negative relationship of volatility of interest rate with stock

price and stock return.

Exchange rate

Commercial banks play a crucial role in facilitating currency exchange for their customers, including individuals, businesses, and other financial institutions. Adjasi *et al.* (2008) found that there is negative relationship between exchange rate volatility and stock market returns - a depreciation in the local currency leads to an increase in stock market returns in the long run. Singh (2015) revealed that exchange rate and stock price are co-integrated and, hence, a long-run equilibrium relationship exists between them. The exchange rate is found to be significant in determining stock price and stock price significantly affects exchange rate. According to Tran *et al.* (2016), foreign exchange rate has an indirect impact on stock price. The fluctuation in foreign exchange rate led to a fluctuation in stock price. Mougoue (1996) showed that there is negative relationship between foreign exchange rate and stock price, means depreciation in currency leads to a decline in stock prices. Bandara *et al.* (2020) indicated that there is significant exposure of Sri Lankan commercial banks to exchange rate movements of US Dollars, Japanese Yen and Market Rate of Return. All banking institutions from the selected sample banking firms are sensitive to the US Dollar exchange rate movements. As per the results, depreciation of domestic currency value against US Dollar delineates negative as well as significant impact on stock returns of the selected banking institutions. Based on it, this study develops the following hypothesis:

H_6: There is a negative relationship of exchange rate with stock price and stock return.

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2013/14 to 2022/23.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 14 commercial banks for the study period from 2013/14 to 2022/23. The dependent variables are SP (Stock price as measured by the closing price of the stock, in Rs) and SR (Stock return as measured by the capital gain yield, in percentage). The independent variables are BR (Bank rate as measured by the cost of return as a percentage of the amount by bank, in percentage), DIR (Deposit interest rate as measured by the rate paid by banks to the customers, in percentage), LIR (Lending interest rate as measured by 2.5% addition in base rate, in percentage), BSR (Base rate as measured by the minimum interest rate set by the central bank below which banks are not permitted to lend, in percentage), VIR (Volatility

of interest rate as measured by the current interest rate minus previous interest rate divided previous interest rate, in percentage) and (Exchange rate, Rs to US Dollar).

Variables	Minimum	Maximum	Mean	Std. Deviation
SP	166	3600	658.66	616.32
SR	5.11	8.19	6.22	0.69
BR	5	8	6.70	1.01
DIP	1.02	9.08	4.94	1.66
LIR	6.67	14.28	10.96	1.72
BSR	4.17	11.78	8.46	1.72
VIR	-0.30	0.84	0.05	0.26
EXR	101.00	134.00	114.78	10.68

Source: SPSS output

Correlation analysis

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and 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 14 commercial banks for the study period from 2013/14 to 2022/23. The dependent variables are SP (Stock price as measured by the closing price of the stock, in Rs) and SR (Stock return as measured by the capital gain yield, in percentage). The independent variables are BR (Bank rate as measured by the cost of return as a percentage of the amount by bank, in percentage), DIR (Deposit interest rate as measured by the rate paid by banks to the customers, in percentage), LIR (Lending interest rate as measured by 2.5% addition in base rate, in percentage), BSR (Base rate as measured by the minimum interest rate set by the central bank below which banks are not permitted to lend, in percentage), VIR (Volatility of interest rate as measured by the current interest rate minus previous interest rate divided previous interest rate, in percentage) and (Exchange rate, Rs to US Dollar).

Variables	SP	SR	BR	DIP	LIR	BSR	VIR	EXR
SP	1							
SR	0.904**	1						
BR	0.432**	0.472**	1					
DIP	-0.650**	-0.690**	-0.414**	1				
LIR	-0.669**	-0.731**	-0.274**	0.590**	1			
BSR	-0.669**	-0.731**	-0.274**	0.590**	1.000**	1		
VIR	-0.150	-0.154	-0.033	0.024	0.502**	0.509**	1	
EXR	-0.385**	-0.508**	-0.700**	0.271**	0.332**	0.332**	0.090	1

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

Table 3 shows that bank rate has a positive relationship with stock price. It means that increase in bank rate leads to increase in stock price. Likewise, there is a negative relationship between deposit interest rate and stock price. It means that increase in deposit interest rate leads to decrease in stock price. Similarly, lending interest rate has a negative relationship with stock price. It shows that higher the lending interest rate, lower would be the stock price. Additionally, there is a negative relationship between base rate and stock price. It indicates that increase in base rate leads to decrease in stock price. However, volatility of interest rate has a negative relationship with stock price. It indicates that increase in volatility of interest rate leads to decrease in stock price. Further, this study shows that there is a negative relationship between exchange rate and stock price. It means that higher the exchange rate, lower would be the stock price.

Similarly, the result also shows that bank rate has a positive relationship with stock return. It means that increase in bank rate leads to increase in stock return. However, there is a negative relationship between deposit interest rate and stock return. It means that decrease in deposit interest rate leads to increase in stock return. Likewise, lending interest rate also has a negative relationship with stock return. It shows that lower the lending interest rate, higher would be the stock return. Moreover, there is also a negative relationship between base rate and stock return. It indicates that increase in base rate leads to decrease in stock return. However, volatility of interest rate has a negative relationship with stock return. It indicates that increase in volatility of interest rate leads to decrease in stock return. Further, this study shows that there is a negative relationship between exchange rate and stock return. It means that higher the exchange rate, lower would be the stock return.

Regression analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and the results are presented in Table 4 and Table 5. More specifically, Table 4 shows the regression results of bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate on stock price of Nepalese commercial banks.

Table 4

Estimated regression results of bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate with stock price

The results are based on panel data of 14 commercial banks with 140 observations for the period from 2013/14 to 2022/23 by using the linear regression model and the model is $SP = \beta_0 + \beta_1 BR + \beta_2 DIR + \beta_3 LIR + \beta_4 BSR + \beta_5 VIR + \beta_6 EXR + e_{it}$ where, the dependent variable is SP (Stock price as measured by the closing price of the stock, in Rs). The independent variables are BR (Bank rate as measured by the cost of return as a percentage of the amount

by bank, in percentage), DIR (Deposit interest rate as measured by the rate paid by banks to the customers, in percentage), LIR (Lending interest rate as measured by 2.5% addition in base rate, in percentage), BSR (Base rate as measured by the minimum interest rate set by the central bank below which banks are not permitted to lend, in percentage), VIR (Volatility of interest rate as measured by the current interest rate minus previous interest rate divided previous interest rate, in percentage) and (Exchange rate, Rs to US Dollar).

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		BR	DIR	LIR	BSR	VIR	EXR			
1	4.084 (11.838)**	0.319 (6.260)**						0.216	0.605	39.186
2	7.627 (57.801)**		-0.285 (11.243)**					0.474	0.495	126.407
3	9.403 (36.757)**			-0.291 (12.595)**				0.531	0.468	158.634
4	8.677 (43.593)**				-0.292 (12.415)**			0.514	0.497	149.278
5	6.239 (106.774)**					-0.38 (1.701)		0.013	0.679	2.893
6	9.92 (18.271)**						-0.032 (6.844)**	0.248	0.592	46.843
7	6.431 (17.249)**	0.154 (3.41)**	-0.247 (9.208)**					0.512	0.477	73.887
8	8.061 (21.815)**	0.139 (3.793)**	-0.132 (4.982)**	-0.193 (8.010)**				0.666	0.395	93.356
9	10.037 (12.842)**	0.104 (2.218)*		-0.304 (12.692)**		-0.69 (4.56)**	-0.011 (2.364)*	0.668	0.394	70.821
10	8.473 (22.039)**	0.138 (3.899)**	-0.123 (3.613)**	-0.247 (8.373)**		-0.478 (3.001)**		0.684	0.384	76.388
11	10.04 (13.475)**	0.034 (0.734)	-0.117 (4.293)**		-0.222 (7.519)**	-0.434 (2.814)**	-0.014 (3.275)**	0.706	0.3709	67.657

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. Stock price is the dependent variable.

Table 4 shows that the beta coefficients for bank rate are positive with stock price. It indicates that bank rate has a positive impact on stock price. This finding is similar to the findings of Madura and Schnusenberg (2000). Likewise, the beta coefficients for deposit interest rate are negative with stock price. It indicates that deposit interest rate has a negative impact on stock price. This finding is consistent with the findings of Sun and Wang (2018). Similarly, the beta coefficients for lending interest rates are negative with stock price. It indicates that lending interest rate has a negative impact on stock price. This finding is similar to the findings of Lashkary *et al.* (2013). Likewise, the beta coefficients for base rate are negative with stock price. It indicates that base rate has a negative impact on stock price. This finding is consistent with the findings of Diasakos *et al.* (2015). Similarly, the beta coefficients for volatility of interest rate are negative with stock price. It indicates that volatility of interest rate has a negative impact on stock price. This finding is consistent with the findings of Nouman *et al.* (2022). Likewise, the beta coefficients for

exchange rate are negative with stock price. It indicates that capital exchange rate has negative impact on stock price. This finding is similar to the findings of Adjasi *et al.* (2008).

Table 5 shows the estimated regression results of bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate with stock return of Nepalese commercial banks.

Table 5

Estimated regression results of bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate with stock return

The results are based on panel data of 14 commercial banks with 140 observations for the period from 2013/14 to 2022/23 by using the linear regression model and the model is $SR = \beta_0 + \beta_1 BR + \beta_2 DIR + \beta_3 LIR + \beta_4 BSR + \beta_5 VIR + \beta_6 EXR + e_{it}$ where, the dependent variable is SR (Stock return as measured by the capital gain yield, in percentage). The independent variables are BR (Bank rate as measured by the cost of return as a percentage of the amount by bank, in percentage), DIR (Deposit interest rate as measured by the rate paid by banks to the customers, in percentage), LIR (Lending interest rate as measured by 2.5% addition in base rate, in percentage), BSR (Base rate as measured by the minimum interest rate set by the central bank below which banks are not permitted to lend, in percentage), VIR (Volatility of interest rate as measured by the current interest rate minus previous interest rate divided previous interest rate, in percentage) and (Exchange rate, Rs to US Dollar).

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		BR	DIR	LIR	BSR	VIR	EXR			
1	4.067 (11.756)**	0.321 (6.286)**						0.217	0.607	39.516
2	7.628 (57.521)**		-0.286 (11.213)**					0.473	0.492	125.734
3	9.413 (36.658)**			-0.292 (12.595)**				0.531	0.469	158.653
4	8.684 (43.465)**				-0.218 (11.925)**			0.491	0.497	141.634
5	6.237 (106.382)**					-0.387 (1.728)		0.014	0.683	2.987
6	9.966 (18.342)**						-0.033 (6.927)**	0.253	0.593	47.981
7	6.416 (17.134)**	0.153 (3.444)**	-0.247 (9.174)**					0.511	0.479	73.745
8	8.054 (21.715)**	0.141 (3.835)**	-0.131 (4.945)**	-0.194 (8.023)**				0.666	14.688	93.357
9	10.101 (12.892)**	0.102 (2.181)*		-0.304 (12.651)**		-0.683 (4.505)**	-0.011 (2.467)*	0.669	0.391	71.081
10	7.842 (22.743)**	0.141 (3.939)**	-0.154 (3.593)**		-0.248 (8.341)**	-0.472 (2.948)**		0.684	0.385	76.158
11	10.108 (13.534)**	0.032 (0.691)	-0.118 (4.304)**		-0.222 (7.483)**	-0.426 (2.758)**	-0.015 (3.389)	0.707	0.371	67.967

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. Stock return is the dependent variable.

Table 5 shows that the beta coefficients for bank rate are positive with stock return. It indicates that bank rate has a positive impact on stock return. This finding is similar to the findings of Vaz *et al.* (2008). Likewise, the beta coefficients for deposit interest rate are negative with stock return. It indicates that deposit interest rate has a negative impact on stock return. This finding is consistent with the findings of Uddin and Alam (2009). Similarly, the beta coefficients for lending interest rates are negative with stock return. It indicates that lending interest rate has a negative impact on stock return. This finding is similar to the findings of Al-Qenac *et al.* (2002). Likewise, the beta coefficients for base rate are negative with stock return. It indicates that base rate has a negative impact on stock return. This finding is consistent with the findings of Alqahtani *et al.* (2021). Similarly, the beta coefficients for volatility of interest rate are negative with stock return. It indicates that volatility of interest rate has a negative impact on stock return. This finding is consistent with the findings of Hajilee and Nasser (2017). Likewise, the beta coefficients for exchange rate are negative with stock return. It indicates that exchange rate has negative impact on stock return. This finding is similar to the findings of Bandara *et al.* (2020).

4. Summary and conclusion

The common stock volatility is a benchmark for measuring risk. It indicates the changing pace in the stock price over a determined period; the more considerable volatility implies that the possibility of gain or loss is higher in short-term. Stock price volatility refers to the degree of variation in a trading price series over time. It is a key aspect of financial markets and is influenced by a variety of factors. Indicators such as bank rate, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate can impact market volatility. Unexpected economic data releases may lead to sudden market movements.

This study attempts to examine the effects of interest rate, exchange rate and their volatilities on stock price of Nepalese commercial banks. The study is based on secondary data of 14 commercial banks with 140 observations for the study period from 2013/14 to 2022/23.

The study showed that the deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate have a negative impact on stock price of Nepalese commercial banks. However, bank rate has a positive impact on stock price and stock return. Furthermore, deposit interest rate, lending interest rate, base rate, volatility of interest rate and exchange rate have a negative impact on stock return. Banks often use deposit funds to provide loans to businesses. When deposit interest rates rise, banks may increase the cost of borrowing for businesses, leading to higher borrowing costs and potentially lower corporate profits. Lower profits can negatively

impact stock prices as investors adjust their expectations for future earnings. The major conclusion of the study is that changes in lending rates can affect the discount rate used to value future cash flows in stock valuation models. Higher lending rates increase the discount rate, reducing the present value of future cash flows and potentially lowering stock prices. Similarly, the study also concluded that lending interest rate, followed by base rate is the most influencing factor that explains the fluctuation in the stock price and stock return of Nepalese commercial banks.

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