Effect of Interest Rate on Economic Performance: A Case of Nepal

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Abstract

This study examines the effect of interest rate on economic performance: A case of Nepal. Gross domestic product (GDP) is selected as the dependable variables. The selected independent variables are lending interest rate, deposit interest rate, net interest margin, total deposits and inflation. The study is based on data of 20 Nepalese commercial banks for the period from 2014/15 to 2020/21. The data were collected from economic survey published by Ministry of Finance, annual report of NRB supervision and economic bulletin of World Bank. The correlation coefficients and regression models are estimated to test the significance and effect of interest rate on economic performance in Nepal.

The study showed that total deposit has a positive impact on GDP growth rate indicating that increase in total deposit leads to increase in GDP growth rate. Similarly, the result shows that there is a positive impact of net interest margin on GDP growth rate. It indicates that higher the net interest margin, higher would be the GDP growth rate. Further, the result shows that there is a negative impact of inflation rate on lending interest rate. It indicates that higher the inflation rate, lower would be the GDP growth rate. Moreover, the result shows that there is a positive impact of lending interest on GDP growth rate. It reveals that higher the lending interest rate higher would be the GDP growth rate. Similarly, the result shows that there is a positive impact of deposit interest on GDP growth rate. It implies that higher the deposit interest rate, higher would be the GDP growth rate.

Keywords: Gross domestic product (GDP), lending interest rate, deposit interest rate, net interest margin, total deposits and inflation

1. Introduction

Interest rate is one of the significant terms in the lending decision process of commercial banks and is the percentage of the loan amount that the lender charges to lend money. (Sheriff & Amoako, 2014). Similarly, Arifi *et al.* (2014) stated interest rate is the amount charged, expressed as a percentage of principal, by the lender to a borrower for the use of assets and is typically noted on an annual basis, known as the annual percentage

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rate (APR). However, Thompson (2006) stated the interest rate is sometimes known as the lease rate and when borrower is a low- risk party, they will usually be charged a low interest rate; if the borrower is considered high risk, the interest rate that they are charged will be higher.

Diebold *et al.* (1990) stated that banks adjust their lending rates asymmetrically and there is a tendency for them to raise their lending rates much more rapidly when market interest rates are rising, as compared to the speed at which they are prepared to lower their lending rates when the market rate is declining. Similarly, Aredo (2004) explained that bank deposits represent the most significant component of the money supply, and a bank deposit is highly correlated to the change in price of goods and services in the economy. However, Humyra (2014) revealed that interest rate has a positive but insignificant impact on deposit growth both in the long run and short run.

Asamoah and Adu (2016) stated an empirical analysis of the determinants of the bank (LIR) in Ghana for the period 1970-2013.The study concluded that the nominal exchange rate and the monetary policy rate have a significant positive impact on the interest rate of bank lending. Likewise, Schnitzel (1986) examined the causation between deposit rates and mortgage loan rates through empirical tests. The study concluded that loan interest rates have been affected by total deposits for the period under the regulated total deposits regime.

Kanwal (2014) investigated the determinants of the interest rate in Pakistan. The study showed that the inflation rate and the exchange rate have a positive significant effect on the interest. Likewise, Arifi *et al.* (2014) examined the effect of determinants on the lending rate of loans in the Kosovo banking system. The study concluded that capital adequacy, management efficiency ratio, liquidity ratio, asset quality ratio, investment, loans and deposits ratios have a significant impact on rate of interest. Moreover, Ali *et al.* (2011) investigated the bank specific determinants of the financing sector of commercial banks in Pakistan. The study concluded that a significant relationship exists between financial behavior and the basel requirements.

Ngata & Njeru (2015) investigated the impression of Basel liquidity accords in the banking system of Kenya on lending rates. The study showed that there is an insignificant relationship between the core capital requirement and reserve ratio requirement on interbank lending rates but significant relationship between the liquidity ratio requirement and interbank lending rates. Moreover, Richard & Okoye (2014) investigated the effect of bank

lending rate on performance in Nigeria. The study concluded that the monetary policy and lending rate had sound effects on the performance of banks. Likewise, Furceri *et al.* (2019) examined the aggregate and distributional effects of financial globalization: Evidence from macro and sectoral data. The study found that lower interest rates can contribute to higher economic growth, but the effects depend on the level of development and other factors.

Sarath and Pham (2015) explored the lending behavior of state-owned and private commercial banks in Vietnamese. The results concluded that deposit growth and liquidity constraint significantly influence loan supply in private banks, while equity growth is the determinant of lending behavior in state owned banks. Similarly, Adzis *et al.* (2018) examined the Malaysian commercial bank lending employed bank specific and macroeconomic variable. The study concluded the bank specific variables like banks size and volume of the deposit have positively and significant effects on lending and liquidity has negatively influence on lending. Moreover, Isa *et al.* (2019) investigated the four specific internal factors influencing the commercial banks' lending behavior in Malaysia. The study found that the volume of deposit, level of liquidity and bank size significantly influences the lending behavior of commercial banks in Malaysia.

Arintoko (2021) investigated the internal factors affecting commercial bank lending: Symmetric and asymmetric effects of macro-level data evidence. The study found that operating expense to operating income (OEOI) has a negative effect only in the short run, assuming symmetric and asymmetric effects and the liquid assets ratio (LAR) has a negative effect on bank lending when it increases both in the short and long run. Likewise, Tomak (2013) examined the determinants of commercial bank interest rate in Turkey for all listed banks in the period 2006 to 2011. The study found that interest rate has a significant impact on interest rate. However, Mousa & Chedia (2016) investigated the determinants of bank lending in Tunisia. The study found that private banks charge higher interest rates than state-owned banks on similar firms or industries, which affect lending.

Christiano *et al.* (2011) investigated understanding the great recession. The study found the federal reserve's response to the 2008 financial crisis, including lowering interest rates and implementing unconventional monetary policies, which helped to stabilize the economy and prevent a deeper recession. Similarly, Reinhart and Rogoff (2011) examined this time is different: Eight centuries of financial folly. The study found that episodes of financial crises

and high levels of government debt can lead to prolonged periods of low interest rates and sluggish economic growth. Likewise, Summers (2014) examined U.S. economic prospects on secular stagnation, hysteresis, and the zero lower bound. The study found that sustained periods of low interest rates, such as those observed in the aftermath of the 2008 financial crisis, can lead to a persistent shortfall in economic growth and employment due to hysteresis effects. However, Eggertsson *et al.* (2019) investigated a model of secular stagnation. The study found that structural factors such as demographic changes and declining productivity growth may lead to a persistent state of low interest rates and sluggish economic growth, which may require unconventional policy responses.

Ho and Saunders (1981) examined the determinants of interest rate margins by using the example of the USA. The study found that the interest rate margins are affected by the management aversion to risk, the size of the transaction, a degree of market competition and the interest rate variability. Likewise, Saunders and Schumacher (2000) examined the determinants of net interest rate margins on a large sample of banks from the USA. The study found the following to affect interest rate margins: the level of bank capitalization, GDP growth rate and interest rate volatility. However, Claeys and Vennet (2008) examined the determinants of interest rate margins in central and eastern European countries with the western European countries. The study showed that foreign banks strengthened the competition in Central and Eastern European countries and that interest rate margins in these countries were reduced due to increased efficiency.

Bernanke and Gertler (1995) investigated inside the black box: The credit channel of monetary policy transmission. The study found that changes in interest rates can affect economic activity by altering the availability of credit and the willingness of lenders to lend, particularly in the case of small and medium-sized businesses. Likewise, Modigliani and Miller (1958) examined the cost of capital, corporation finance and the theory of investment. The study found that changes in interest rates can affect the cost of capital and the behavior of firms, which can in turn impact investment and economic performance. However, Romer and Romer (2004) investigated a new measure of monetary shocks: Derivation and implications. The study found that monetary policy shocks, such as changes in interest rates, can have significant effects on economic activity and inflation in the short run, but their long-run effects are more uncertain.

In the context of Nepal, Shrestha and Pokhrel (2019) investigated the factors affecting stock index in Nepal. The study revealed that stock index responds significantly to changes in political environment and the policies of Nepal Rastra Bank about lending against share collateral and partly to paid-up capital hike. Similarly, Maskay and Pandit (2009) concluded that there is a significant long run elasticity coefficient of the policy rate (taken to be the bank rate) to the different market rates (e.g., 1-year fixed deposit, lending rate and saving rate), but there is only one error correcting relationship between the bank rate and the lending rate in the short run. Likewise, Bhattarai (2015) analyzed the determinants of lending interest rates of Nepalese commercial banks. The study revealed that operating costs to total assets ratio, profitability (ROA) and inflation have significant positive impact on the commercial bank lending rate. However, Ojha (2020) examined the determination of interest rate in Nepalese finance companies. The study concluded that interest rate on loan and advance of the company has significant positive relation with interest rate on deposit and interest rate on loan and advance also has positive relation with inflation rate.

The above discussion reveals that the empirical evidences vary greatly across the studies concerning the effect of interest rate on economic performance. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such findings using more recent data exist in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The main purpose of the study is to analyze the effect of interest rate on economic performance in Nepal. Specifically, it examines the effect of lending interest rate, deposit interest rate, net interest margin, total deposits and inflation on GDP growth rate.

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 section draws the conclusion.

2. Methodological aspects

This study is based on secondary data of Nepalese commercial banks. The data are collected for the time period of 2015/16-2020/21, leading to the total of 140 observations. The main sources of data include repot of NRB bank supervision, economic bulletin of World Bank and Quarterly Economic Bulletin published by Nepal Rastra Bank. The study is based on descriptive

and causal comparative research designs. Table 1 shows the list of Nepalese commercial banks selected for the study along with study period and number of observations.

Table: 1

List of commercial banks selected for the study along with the study period and number of observations

S.N.	Name of commercial banks	Study Period	Observations
1	Prime Commercial Bank Ltd.	2015/16-2020/21	7
2	Kumari Bank Ltd.	2015/16-2020/21	7
3	Civil Bank Limited	2015/16-2020/21	7
4	Century Commercial Bank Limited	2015/16-2020/21	7
5	Nepal Investment Bank Limited	2015/16-2020/21	7
6	Mega Bank Nepal Limited	2015/16-2020/21	7
7	Sunrise Bank Limited	2015/16-2020/21	7
8	Sanima Bank Limited	2015/16-2020/21	7
9	Machhapuchhre Bank Limited	2015/16-2020/21	7
10	NIC ASIA Bank Limited	2015/16-2020/21	7
11	Prabhu Bank Limited	2015/16-2020/21	7
12	Siddhartha Bank Limited	2015/16-2020/21	7
13	Global investment bank limited	2015/16-2020/21	7
14	Everest bank Limited	2015/16-2020/21	7
15	Himalayan bank limited	2015/16-2020/21	7
16	NMB Bank Ltd.	2015/16-2020/21	7
17	Century Commercial Bank Ltd.	2015/16-2020/21	7
18	Rastriya Banijya Bank Ltd.	2015/16-2020/21	7
19	Agriculture Development Bank Ltd.	2015/16-2020/21	7
20	Nepal Bank Ltd.	2015/16-2020/21	7
Total Observation			**140**

Thus, this study is based on 140 observations.

The model

The model in this study assumes that GDP growth rate depends on lending interest rate, deposit interest rate, inflation rate, net interest margin and total deposits. Therefore, the model to be estimated in this study is stated as follows:

GDP = $\beta_0 + \beta_1$ LIR + β_2 DIR+ β_3 INF+ β_4 NIM + β_5 TD+

Where,

GDP= Gross domestic product means monetary value of final goods and services, that is, those that are bought by the final user produced in a country in a given period of time, expressed in billions dollar.

LIR = Lending Interest Rate is the amount charged by lenders for a certain period as a percentage of the amount lent or deposited, expressed in percentage.

DIR= Deposit interest rate is rate paid by commercial or similar banks for demand, time, or savings deposits, expressed in percentage.

INF= Inflation means increase in the general price level, expressed in percentage.

NIM= Net interest margin compares the net interest income a financial firm generates with the outgoing interest it pays.

TD= Total deposits means amount collected by banks from customers, expressed in Rs billions.

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

Lending interest rate (LIR)

An interest rate is the price a borrower pays for the use of money he does not own, and has to return to the lender who receives for deferring his consumption, by lending to the borrower. Hancock (1985) confirmed that the conjecture that a higher level of market interest rates has a positive impact on GDP growth rate. In addition, the effect of interest rate spread changes on microfinance institutions' profitability is shown to be asymmetric with the effect originating from lending rates being greater than those of deposit rates affecting the GDP growth rate. Similarly, Obamuyi (2009) investigated an investigation of the relationship between interest rates and economic growth in Nigeria. The study found that there is a positive relationship between lending interest rate and GDP growth rate. Likewise, Obamuyi and Olorunfemi (2011) examined financial reforms, interest rate behavior and economic growth in Nigeria. The study found that there is a positive relationship between lending interest rate and GDP growth rate. Based on it, this study develops the following hypothesis:

H_1: There is a positive impact of lending interest rate on GDP growth rate.

Deposit interest rate (DIR)

Deposit rate is the interest rate paid by financial institutions to deposits account holders. Humyra, (2014) examined impact of financial development on exchange rate volatility and long-run growth relationship of Bangladesh. The study found that there is a positive relationship of deposit interest rate on GDP growth rate. However, one of the most effective factors for deciding to deposits in banking system is the interest rate and found a positive relationship between GDP growth rate and interest rate (Namazi and Salehi, 2010). Similarly, Menza (2019) examined empirical analysis of long-run and short-run dynamic effects of deposit rate, inflation rate and GDP on bank deposit: Vector error correction model approach. The study revealed average inflation rate and GDP have a negative effect on deposit, while deposit rate has a positive effect on the total amount of deposit on economic performance. Based on it, this study develops the following hypothesis:

H_2: There is a positive impact of deposit interest rate on GDP growth rate.

Inflation rate (INF)

Inflation rate is the rate at which prices increases over time, resulting in a fall in the purchasing value of money. Inflation can be defined as obstinate increase in general price levels in an economy over the long period of time (Umar and Zubairu, 2012). Similarly, Berument (1999) found that both the expected inflation and the conditional variability of inflation negatively affect the UK three-month Treasury-bill rate. Likewise, Anari and kolari (2016) revealed that there is a dynamic relationship between interest and inflation rates that are jointly determined due to the dual existence of Fisher and Wicksell processes. The study revealed that there is a negative relationship between inflation and interest rates where in causality runs from inflation to interest rates. Based on it, this study develops the following hypothesis:

H_3: There is a negative impact of inflation rate on GDP growth rate.

Net interest margin (NIM)

Net interest margin (NIM) is a measurement comparing the net interest income a financial firm generates from credit products like loans and mortgages, with the outgoing interest it pays holders of savings accounts and certificates of deposit (CDs). Maudos and Solisa (2009) examined the

determinants of net interest income in the Mexican banking system: An integrated model. The study concluded that there is a positive relationship between net interest margin and GDP growth rate. Likewise, Drakos (2003) investigated assessing the success of reform in transition banking 10 years later: An interest margins analysis. The study revealed that there is a positive relationship between GDP growth rate and net interest margin. According to Angbazo (1997), adequate NIMs are expected to generate sufficient income to increase capital with increasing exposure to risk. While it is well known that the net interest margin is a significant element of bank profitability, the effects of market interest rate volatility and default risk on the margins are not well recognized. Based on it, this study develops the following hypothesis:

H_4: There is a positive impact of net interest margin on GDP growth rate.

Total deposits (TD)

Bank deposits are the sum amount of money placed into banking institutions for safekeeping. Ojeaga *et al.* (2013) analyzed the impact of interest rate on bank deposits evidence from the Nigerian banking sector. The study revealed that there is a positive relation between total deposits and GDP growth rate. Similarly, Kaymaz and Kaymaz (2011) investigated the strong evidence of one-way causality between loan interest rates and total deposits. The study revealed a significant positive correlation between loan interest rates and total deposits and GDP growth rate. Likewise, Enyioko (2012) investigated the impact of interest rate policy and performance of deposit money banks in Nigerian. The study concluded that increase in total deposits by any banks results in increase in interest rates. Based on it, this study develops the following hypothesis:

H_5: There is a positive impact of total deposits on GDP growth rate.

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2014/15 through 2020/21.

Table 2

Descriptive statistics for Nepalese commercial banks

(This table shows the descriptive statistics of dependent and independent variables of 20 Nepalese commercial banks for the study period of 2015/16 to 2020/21. Dependent variable

is GDP (Gross domestic product means monetary value of final goods and services, that is, those that are bought by the final user produced in a country in a given period of time). Independent variables are LIR (Lending Interest Rate is the amount charged by lenders for a certain period as a percentage of the amount lent or deposited), DIR (Deposit interest rate is rate paid by commercial or similar banks for demand, time, or savings deposits), INF (Inflation means increase in the general price level), NIM (Net interest margin compares the net interest income a financial firm generates with the outgoing interest it pays) and TD (Total deposits means amount collected by banks from customers).

Variables	Minimum	Maximum	Mean	Std. Deviation
GDP	24.52	34.27	31.50	3.63
TD	29.89	28.79	111.40	53.13
NIM	1.87	5.69	3.13	0.66
INF	3.69	9.93	5.48	2.14
LIR	9.62	12.47	11.11	0.98
DIR	3.28	6.72	5.90	1.19

Source: SPSS output

Correlation analysis

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

Table 3

Pearson's correlation coefficient matrix

(This table shows the descriptive statistics of dependent and independent variables of 20 Nepalese commercial banks for the study period of 2015/16 to 2020/21. Dependent variable is GDP (Gross domestic product means monetary value of final goods and services, that is, those that are bought by the final user produced in a country in a given period of time). Independent variables are LIR (Lending Interest Rate is the amount charged by lenders for a certain period as a percentage of the amount lent or deposited), DIR (Deposit interest rate is rate paid by commercial or similar banks for demand, time, or savings deposits), INF (Inflation means increase in the general price level), NIM (Net interest margin compares the net interest income a financial firm generates with the outgoing interest it pays) and TD (Total deposits means amount collected by banks from customers).

Variables	GDP	TD	NIM	INF	LIR	DIR
GDP	1					
TD	0.49**	1				
NIM	0.02	0.01	1			
INF	-0.78**	-0.33**	0.08	1		
LIR	0.74**	0.18*	0.23**	-0.45**	1	
DIR	0.89**	0.32**	0.07	-0.88**	0.75**	1

Notes: The asterisk signs (*) indicate that the results are significant at five percent level.

Table 3 shows that total deposit is positively correlated to GDP growth rate. It indicates that increase in total deposit increase in GDP growth rate. Similarly, net interest margin rate is positively correlated to GDP growth rate. It revealed that higher the Net interest margin, higher would be the GDP growth rate. Further, inflation rate is negatively correlated to lending interest rate. It indicates that higher the inflation rate, lower would be the GDP growth rate. In addition, lending interest rate has a positive relationship with GDP growth rate. It revealed that increase in lending interest rate leads to increase in GDP growth rate. Similarly, deposit interest rate is positively correlated to GDP growth rate. It indicates that higher the deposit interest rate, higher would be the GDP growth rate.

Regression Analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and the results are presented in Table 4. More specifically, it shows the regression results of lending interest rate, deposit interest rate, inflation rate, total deposit, net interest margin on gross domestic product.

Table 4 shows the estimated regression results lending interest rate, deposit interest rate, inflation rate, total deposit, net interest margin on GDP growth rate in Nepalese commercial banks.

Table 4

Estimated regression results of lending interest rate, deposit interest rate, inflation rate, total deposit, and net interest margin on GDP growth rate

(The results are based on panel data of 20 commercial banks with 140 observations for the period of 2015/16-2020/21 by using the linear regression model and the model 1 is GDP $= \beta_0 + \beta_1 LIR + \beta_2 DIR + \beta_3 INF + \beta_4 NIM + \beta_5 TD + i$ where, the dependent variable is GDP (Gross domestic product means monetary value of final goods and services, that is, those that are bought by the final user produced in a country in a given period of time). Independent variables are LIR (Lending Interest Rate is the amount charged by lenders for a certain period as a percentage of the amount lent or deposited), DIR (Deposit interest rate is rate paid by commercial or similar banks for demand, time, or savings deposits), INF (Inflation means increase in the general price level), NIM (Net interest margin compares the net interest income a financial firm generates with the outgoing interest it pays) and TD (Total deposits means amount collected by banks from customers).

Model	Intercept	Regression coefficients of					Adj. R_bar2	SEE	F-value
		TD	NIM	INF	LIR	DIR			
1	27.71 (41.08) **	0.03 (6.22) **					0.24	3.16	38.79
2	31.97 (19.68) **		0.15 (0.29)				0.08	3.65	0.08
3	38.81 (68.04) **			-1.33 (13.75) **			0.61	2.26	189.07
4	0.69 (0.27)				2.77 (12.20) **		0.55	2.42	148.87
5	15.52 (20.18) **					2.70 (21.19) **	0.79	1.66	449.06
6	28.32 (18.48) **	0.03 (6.21) **	0.19 (0.44)				0.23	3.18	19.36
7	16.46 (7.77) **			-0.95 (12.28) **	1.82 (10.75) **		0.80	1.61	244.36
8	15.12 (22.16) **	0.01 (5.87) **				2.47 (20.76) **	0.83	1.47	305.65
9	2.31 (0.94)		1.18 (3.59) **		2.96 (13.29) **		0.59	2.31	88.44

Notes:

i. Figures in parentheses are t-values.
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent levels respectively.
iii. GDP is the dependent variable.

The regression result shows that the beta coefficients for total deposit (TD) are positive with GDP growth rates. It indicates that total deposit has a positive impact on GDP growth rates. This finding is similar with the findings of Ojeaga *et al.* (2013). Likewise, the beta coefficients for net interest margin are positive with GDP growth rates. It reveals that net interest margin has a positive impact on GDP growth rates. This finding is consistent with the findings of Drakos (2003). Similarly, the beta coefficients for inflation rate are negative with GDP growth rates. It reveals that the inflation rate has a negative impact on GDP growth rates. This finding is consistent with the findings of Anari and kolari (2016). Further, the beta coefficients for lending interest rate are positive with GDP growth rates. It indicates that lending interest rate has a positive impact on GDP growth rates. This finding is similar with the findings of Hancock (1985). However, the beta coefficients for deposit interest rate are positive with GDP growth rates. It reveals that deposit interest rate has a positive impact on GDP growth rates. This finding is similar to the findings of Namazi and Salehi, (2010).

4. Summary and conclusion

Interest rate is the amount charged, expressed as a percentage of principal, by a lender to a borrower for the use of assets. Lending institutions give out money in terms of loans on which they charge a percentage rate as

interest payment. On the other hand, savers lend to the institutions in terms of deposits from which they expect to receive a percentage payment as interest. Therefore, interest rates include the rates paid for deposits (deposit rate) and the rates charged on loans (lending rate) for a given time period. Interest is paid for the sacrifice made by the income holder by deferring consumption for the time being and imparting with liquidity and to reward the income holder for their savings. Interest rate is the reward for giving up liquidity for a specified period of time.

The study attempts to analyze the effect of interest rate on economic performance: A case of Nepal. The study is based on secondary data of with 20 observations of Nepalese commercial banks for the period of 2015/16 to 2020/21. The study is based on secondary observation with 140 observations.

The major finding of this study is that the lending interest rate, deposit interest rate, net interest margin, total deposits and inflation are major factors that affect interest rate on economic performance of Nepal. The study shows that net interest margin, lending interest rate, deposit interest rate and total deposit have a positive relationship with GDP growth rate. The study also shows that inflation have negative relation with GDP growth rate. The study concludes that total deposit followed by lending interest rate, net interest margin, deposit interest rate and inflation are most influencing factors which explains the effect of interest rate on economic performance in Nepal.

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