# Bank Interest Rates and Deposit Growth in Nepal 

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#### Abstract

Nepalese banking is characterized by the fragmented system where different classes of banks and financial institutions operate simultaneously. Recently, sluggish deposit growth leads to tighter Credit to Deposit Ratio (CD- ratio) and banks suffer from deficit of loanable funds. Immediate response of banks at the time of shortfall of deposit is increasing deposit interest rate. Does bank's strategy of increasing deposit rate work? This is key question of this paper. This study aims to find the interest elasticity of bank deposit in Nepalese commercial banks. Monthly average data of deposit and interest are used for the purpose of analysis and the result shows unitary elasticity of interest rate. Bank deposit and bank's liquid assets holding have highly significant negative relationship. This study reveals weak association of interest rate change and deposit growth. Banks are recommended to increase banking access and enhance better banking services for sustainable deposit growth.


Keywords: ARDL, CD-Ratio, Deposit Interest Rate, GDP, Non-Performing Loan

## 1. Introduction

Interest rate volatility is one of the key feature of Nepalese banking after deregulation of it since 1989. In the early phases, deposit interest rates were kept relatively high aiming to ensure that no savings from Nepal would shift to India with hopes of a higher return (Khanal, 2011). Therefore, in the early banking practice, Nepalese banking was largely oligopolistic and generally unresponsive to market signals (Glower, 1994). After financial liberalization and implementation of deregulation policies, banks operate in more competitive environment in Nepal. However, banking sector resiliency could not still be realized at most due to mismatches in credit and deposit growths. In last 10 years, bank credit grew by 415 percent while bank deposit grew only by 316 percent points. Banks usually increase deposit rate at the time of shortfall of deposit compared to credit to keep CD-ratio within policy limit.

Banks maintain interest bearing and interest not bearing accounts for deposit. However, all types of deposits are not considered for the purpose of calculating CD-ratio as provisioned by Nepal Rastra Bank (NRB). This enables banks to maintain proper mix of the deposits for more sustainability and more resilient banking. In theory, long term credits are financed from long term deposits and short term credits are financed from short term deposits. However, banks frequently fail to manage such deposit composition and face banking problems.

Post COVID banking sector in Nepal faces credit crunch due to huge expansion of credit growth but sluggish growth of bank deposits since 2021. To attract more deposits, Nepalese banks increased interest rate in deposit by 56 percentage in a year that led to increment of base rate by 41 percentage and credit interest rate by 36 percentage in a year.

[^0]There is a debate regarding central bank's direct - indirect and formal - informal control over interest rate. However, there is also a strong consensus among the policy makers and scholars about direct market intervention and banks are partially free to offer interest rate as a strategy to attract more deposit in Nepal. Central bank limits a cap of increasing deposit interest rate not more than 10 percentage point of previous interest rate and binds to maintain spread rate also. Therefore, Nepalese banks are partially free to change the interest rate. However, banks' immediate response at the time of tight CD-ratio is to increase deposit interest rate. At what extent their strategy works? It needs an investigation.

Deposit growth is function of macroeconomic factors and bank specific factors. Macroeconomic factors include a large number of external variables like remittance, interest rate differential and government expenditure. Economic growth, inflation, population growth, political stability affect significantly to deposit growth (Banke \& Yitayaw, 2002). Studies found that extent of transmission from policy rate to market rate matter in sound banking growth. IMF study found that liquidity ratio and NPL are important determinants of pass through (Harald \& Hesse, 2009). External factors like remittance growth and external shocks specially matter in case of outward oriented economies like Nepal. In such a case, effectiveness of internal strategies of banks like interest rate policies might be effective.

This study simply aims to investigate how sensitive is bank deposit with interest rate in Nepalese banks. The key objectives are to find interest elasticity of bank deposits in commercial banks, to analyse the correlation of interest rate, to estimate how increased number of accounts and bank branches affect bank deposits and to analyse the possible other factors affecting bank deposits in Nepalese banks.

## 2. Literature Review

Available studies on determinant of bank deposit can be divided in two categories based on the independent variables. First type of studies identify the bank specific variables while overall macroeconomic variables and external variables are used by second type of studies. Such important determinants include Gross National Product (GNP), growth rate, Consumer Price Index (CPI), Remittance growth rate and oil prices. However, these study is specially focused on banks' interest rate policies and deposit growth. Studies find that banks' loan exposure, liquidity buffer and interest margins bear a significant influence on deposit growth. CD-ratio is the benchmark for a bank's strategy on either deposit and credit. At the time of high CD-ratio, banks tend to increase deposit interest rate to attract more deposit while opposite strategy is applied at the time of comfortable CD-ratio as provisioned by NRB. Bank specific variables include CD-ratio, liquidity ratio, profitability ratios, Return on Equity and Assets as determinants of deposit growth. Shemsu (2015) included bank specific and macroeconomic variables like deposit interest rate, branch opening, Gross Domestic Product (GDP), inflation and remittance inflow in the Ordinary Least Square (OLS) regression model. The explanatory variables showed positive relationships; remittance inflow and branch opening have been found significant. Finger \& Hesse (2009) applied Vector Error Correction (VECM) and found that perceived riskiness of individual banks, their liquidity buffers, loan exposure, and interest margins, bear a significant influence on the demand for deposits. This study identifies both macroeconomic and banks specific variables as significant variables determining bank deposit in Lebanon. Khadka (2010) finds that correlation coefficient between interest rate and deposit is positive but insignificant for selected commercial banks of Nepal. Habtamu et al. (2021) employed both macroeconomic and bank specific variables to examine determinants of deposit
growth in Ethiopia. They used OLS method with Hausman test to determine the appropriateness of fixed effect. The study finds that branch expansion has positive and significant effect while bank size has positive but insignificant effect on deposit growth. Similar study in Turkey used auto regressive distributive lag model and found branch expansion and broad money supply have significant impact while macroeconomic factors are responsible for long term determinants of deposit (Yakubu \& Aziza,2020). Hartwell \& Korovkin (2021) included monetary policy rate and share index as additional explanatory variables. This study asserts long run negative association between deposit rate and deposit. Author establishes that presence of inflation influenced such relationship.

In Nepalese case, very few studies are available. Pradhan et al. (2017) included economic growth rate, number of bank branches, inflation and ROA as explanatory variables for selected bank deposits and found all variables have significant and usual expected relationships.

The studies based on association between interest rate and deposit growth obviously show positive impact in most of the cases. In advanced economies this relationship is more observable when we use real interest rate as a determinant. El-Seoud (2014) shows nominal interest rate has positive and significant relationship with national saving only in the short run. A contrary finding has been found in Ethopia that shows negative and significant impact of interest rate on deposit with coefficient -5.22 (Teshome, 2017). Researcher explained banks operating with no competition and deposits are affected through other factors like service quality, product differentiation and others. The theoretical underpinning of such a behaviour can be explained as negative interest rate that is an exceptional policy of the banks at the period of excessive deposit and sluggish credit growth. A number of other socio-economic factors might have strong association with deposit in developing countries such that saving behaviour and bank deposit might have unconventional relationship.

## 3. Methodology

### 3.1 Theoretical Framework

The ultimate source of bank deposit is private saving. Theory of consumption, saving and investment better explain the behaviour of private saving and its mobilization. Researchers estimate interest elasticity of saving for the purpose of determining saving function (Gylfason, 1981). Some other derive an aggregate saving function in a continuous time life-cycle framework (Modigliani,1986) such that consumer maximizes intertemporal utility function subject to life time budget constraint. Classical theory of money and interest is based on perfect competition, quantity theory of money and Say's law of market so that market interest is reward of saving and saving equals investment for macroeconomic equilibrium. J.M. Keynes and New Keynesian economists denied such high interest elasticity of saving and state that saving is the function of income. However, modern theories of money and income accept some degree of interest elasticity of saving even in the short run. Milton Friedman's theory of consumption, popularly known as permanent income hypothesis states that a person saves if he/she expects that his/her long term expected average income (Permanent Income) is less than the current income. According to life cycle hypothesis, consumer smooth outs the consumption decisions based on the resources available over life time. This theory also establishes the saving behaviour in different stages of human life; at the middle age of human life, person is net saver. The buffer stock theory assumes that saving rate is pro-cyclical. Being impatient and prudent, people save for contingency time. All of the theories of consumers behaviour,
macroeconomic theories of income, employment and money do accept that saving is function of interest rate in direct way or indirectly. In modern theories, saving is multivariate function of income, interest rate, age, population specific variables and other socio-economic variables. Banking practice and effectiveness of bank operation has significant impact upon saving behaviour in developing countries and bank deposit is related to saving behaviour as well (Malkina, 2009). The way saving channels as bank deposit depends mainly upon access and efficiency of banks. This further depends upon policy variables related to central bank and government. In developing countries like Nepal, about half of the business activities are related to informal sector and shadow economy consists 30 to 40 percentage of the total size of economy (CBS, 2018; Paudel, 2020). Thus, bank deposits also depend upon the extent of informal sector formalization also.

### 3.2 Data and Model

Time series analysis has been made to find the determinant of bank deposit. Change in bank deposit is influenced by many factors related to bank specific variables and other variables. Bank specific variables include deposit interest rate, number of bank accounts, increased number of bank branches, bank's behaviour of holding liquid assets and so on. Other variables include macro economic variables like GDP, inflation, remittance inflow, interest rates differentials and so on. This study includes bank specific variables as determinants of deposit as specified earlier.

Data covers the commercial banks' monthly statistics obtained from Nepal Rastra Bank (NRB), the central bank of Nepal during fiscal year 2013/2014 to 2021/2022. Total of 110 months' data are available and monthly statistics for the mid April to mid May 2015 are partially available in NRB repository. So, average data of previous month's statistics and next month's statistics have been taken for completeness of data. The general model with specification of the variables includes;
$\mathrm{LBD}=\alpha+\beta_{1} \mathrm{ADR}+\beta_{2} \mathrm{NAC}+\beta_{3} \mathrm{NPL}+\beta_{4} \mathrm{TLADR}+\beta_{5} \mathrm{NBB}+\varepsilon$
Where,
LBD $=\log$ of Bank Deposit
ADR $=$ Average Deposit Interest Rate
NAC $=$ Number of Bank Accounts
NPL $=$ Non Performing Loan ratio
TLADR $=$ Total Liquid Assets to Deposit Ratio
NBB $=$ Number of Bank Branches
$\varepsilon=$ Error term

## 4. Result

### 4.1 Nature of Bank Interest Rate, Deposit and Credit

Banks often increase deposit rate at the time of shortfall of deposit compared to credit. But, the correlation between deposit growth and interest rate change is not strong. Therefore interest rate growth
follows when banks are in tighter CD- ratio. Therefore, banks' strategy of increasing deposit rate follows after situation of tight CD-ratio.

Figure 1: Deposit Growth and Interest Rate Change in Monthly Basis


In most of the time interest rate growth outstrips the deposit growth. Banks are not able to attract deposits as expected by increasing the interest rate when credit to deposit ratio is more tighter. Interest rate growth and deposit growth show perverse relationship as shown through arrows in figure 1.

Figure 2: Credit and Deposit Ratios


Credit and deposits as ratio of GDP show the regular increasing trend and move in cyclical basis. Total credit to total deposit ratio is higher than credit and deposits compared to GDP until the beginning of crisis due to COVID 19 and Lockdown that began in mid 2020. In this period, banks realized excess deposits so that credit to deposit ratio was lower. Nepalese banking got almost V shaped recovery
immediately after lockdown period in terms of deposit and lending such that total credit to total deposit ratio has been all time higher (96.82). But deposit growth halts immediately. This leads immediate downturn in banking and banks are facing shortfall of loanable fund after the COVID 19 lockdown.

Figure 3: Interest Rate Movement


Average credit rate is all time higher, 10.64 compared to average deposit rate, 5.37 during the study period. Banks need to operate with central bank declared spread rate while offering interest rates in deposits and lending. In recent years central bank is decreasing the spread rate. Banks' interest rate pattern shows similar movement of all types of rates. At the time of expansion, saving interest rate and call deposit rate converge and at the time of shortfall of deposits, they tend to diverge. This shows banks do not offer stable deposit rates for the depositors. Banks focus on fixed deposits growth providing more than two times higher average interest rate on fixed deposit. Table 1 shows summary of various interest rates offered by banks during the study period.

Table 1: Summary of Bank Interest Rates and Deposits

| Interest Rate | Mean | Standard Deviation | Minimum | Maximum |
| :--- | :--- | :--- | :--- | :--- |
| Saving Deposit Rate | 3.77 | 1.21 | 2.01 | 7.42 |
| Saving Deposits (Rs. million) | 982178.8 | 312146.9 | 477823 | 1624863 |
| Fixed Deposit Rate | 8.36 | 1.66 | 5.39 | 10.63 |
| Saving Deposits (Rs. million) | 1305201 | 795163 | 432136.5 | 3070916 |
| Call Deposit Rate | 3.44 | 1.32 | 0.84 | 7.28 |
| Saving Deposits (Rs. million) | 351824.4 | 53350.25 | 219372.5 | 442951.3 |
| Average Deposit Rate | 5.37 | 1.36 | 2.94 | 8.32 |
| Saving Deposits (Rs. million) | 2914609 | 1225653 | 1246786 | 5182548 |
| Average Credit Rate | 10.64 | 1.30 | 8.43 | 12.65 |
| Saving Deposits (Rs. million) |  |  |  |  |

Average Spread rate for the study period is 5.27 . Table 1 shows fixed deposit rate and fixed deposit amount both vary more than other interest rates and amounts. Banks concentrate increasing fixed deposits; the fixed deposit to total interest bearing deposits is continuously increasing from 37 percentage at the beginning of study period to 64 percentage at the end of the study period. The opposite is true for
other interest bearing deposits. This implies that banking customers are more sensitive to interest rates and bank deposits are more risky relying upon single product.

Figure 3: Fixed and Other Interest Bearing Deposit Growth


The figure 3 shows the negative correlation between fixed deposit growth and other interest bearing deposit growth. When we quantify the information, we get correlation matrix as below in table 2 .

Table 2: Correlation Matrix

|  | Fixed Deposit Growth | Other Interest Bearing <br> Deposit Growth | Current Deposit <br> Growth |
| :--- | :---: | :---: | :---: |
| Fixed Deposit Growth | 1 |  |  |
| Other Interest Bearing <br> Deposit Growth | -0.42 | 1 |  |
| Current Deposit Growth | -0.11 | 0.39 | 1 |

This result shows reshuffling of the deposits as result of interest rate increase by the commercial banks. Fixed deposits move at the opposite direction of other deposits. Such relationship is not expected result because banks' strategy of interest rate change is changing all deposit rates at the same time and towards same direction. This relationship might be due to the fact that fixed rate vary more than saving and other deposit rates.

### 4.2 Regression Analysis

The results of Augmented Dickey Fuller Unit Root Test are verified through Phillips-Perron Unit root tests. Variables ADR, NPL and TLADR are not stationary at level but are stationary at first difference while three other variables NBD, LBD and NAC are stationary at first difference.

Table 3: Stationary Test

| Variable | Test Statistics <br> $\mathbf{Z ( t )}$ | $\mathbf{1 \%}$ Critical <br> Value | $\mathbf{5 \%}$ Critical <br> Value | $\mathbf{1 0 \%}$ Critical <br> Value |
| :---: | :---: | :---: | :---: | :---: |
| ADR (Level) | 0.848 | -2.599 | -1.950 | -1.611 |
| (First diff.) | -3.622 | -2.599 | -1.950 | -1.611 |
| NPL (Level) | -1.266 | -2.599 | -1.950 | -1.611 |
| (First diff.) | -6.784 | -2.599 | -1.950 | -1.611 |
| TLADR (Level) | -1.081 | -2.599 | -1.950 | -1.611 |
| (First diff.) | -7.878 | -2.599 | -1.950 | -1.611 |
| NBB (Level) | 4.821 | -2.599 | -1.950 | -1.611 |
| LBD (Level) | 9.050 | -2.599 | -1.950 | -1.611 |
| NAC (Level) | 10.086 | -2.599 | -1.950 | -1.611 |

Using AIC criteria, optimum lags for the variables include upto second lags. NBB has no lag, NPL and NAC have two lags while others have one lag. Thus, to find out the long run relationship of the variables, nature of the variables implies Bound test from ARDL. The error correction ARDL Bound tests (table 4) show no long run relationships between the variables and results are shown in the appendix 1 .

Table 4: ARDL Bound Test Results
Pesaran/Shin/Smith (2001) ARDL Bounds Test
$\mathrm{H}_{0}$ : No levels relationship

$$
\begin{aligned}
& F=1.962 \\
& t=-2.783
\end{aligned}
$$

Critical values $(0.1-0.01)$, F-statistic, case 3

|  | $[$ I_0] | [I_1] | $[$ I_0] | $[$ I_1] | [I_0] | [ I_1] | [I_1] | [ I_1] |
| :---: | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  | L_1 | L_1 | L_05 | L_05 | L_025 | L_025 | L_01 | L_01 |
| k_5 | 2.26 | 3.35 | 2.62 | 3.79 | 2.96 | 4.18 | 3.41 | 4.68 |

Accept if $\mathrm{F}<$ critical value for $\mathrm{I}(0)$ regressors
Reject if $\mathrm{F}>$ critical value for $\mathrm{I}(1)$ regressors
Critical values $(0.1-0.01), \mathbf{t}$-statistic, case 3

|  | $[\mathrm{I}$-0] | [ I_1] | [I_0] | [ I_1] | [I_0] | [ I_1] | [ I_1] | [ I_1] |
| :---: | :--- | :---: | :--- | :---: | :--- | :--- | :--- | :--- |
|  | L_1 | L_1 | L_05 | L_05 | L_025 | L_025 | L_01 | L_01 |
| k_5 | -2.57 | -3.86 | -2.86 | -4.19 | -3.13 | -4.46 | -3.43 | -4.79 |

Accept if $t>$ critical value for $I(0)$ regressors
Reject if $\mathrm{t}<$ critical value for $\mathrm{I}(1)$ regressors
Thus we analyze the relationship between variables without error correction and the results are presented in table 5.

Table 5: Regression Results

|  | Number of Observation: 109 |  | F(12 96) $=\mathbf{1 9 6 9 2 . 6 9}$ <br> Root MSE: 0.0091 |  | R-Squared = 0.9996 <br> Adjusted R-Squared $=\mathbf{0 . 9 9 9 5}$ |  |  |
| :--- | :--- | :--- | :---: | :---: | :--- | :--- | :---: |
| Variable | Coefficient | Standard Error | $\mathbf{t}$ | P>ItI |  | 95\% Conf. Interval |  |
| ADR | $0.0103^{*}$ | 0.0058 | 1.76 | 0.081 | -0.00128 | 0.02192 |  |
| NPL | -0.0144 | 0.0095 | -1.52 | 0.132 | -0.0333 | 0.00441 |  |
| TLADR | $-0.0046^{* * *}$ | 0.0009 | -5.15 | 0.000 | -0.0063 | -0.0028 |  |
| NBB | 0.0001 | 0.00001 | 1.36 | 0.176 | -0.00001 | 0.0001 |  |
| NAC | $0.01034^{* *}$ | 0.0520 | 2 | 0.049 | 0.00062 | 0.2070 |  |

*Significant at $10 \%$ level, ** Significant at 5\% level and ${ }^{* * *}$ Significant at $1 \%$ level
Overall model is highly significant. The DW test and Breusch-Godfrey LM test verify no serial autocorrelation. The white test for homoskedasticity does not reject the null hypothesis and results are given in table 6. The coefficients for each variables show the expected results. Average deposit rate shows positive but significant relationship with average deposit i.e. one percent change in average deposit rate leads to about one percent change in bank deposits, holding other factors constant. Bank's nonperforming loan and liquid asset holding have negative effect over bank deposits. Liquidity position has immediate effect while NPL has lag effect over deposit. This might be due to the fact that banks concentrate on NPL recovery more at the time of excess liquidity and higher NPL. Number of bank branches and increased number of bank accounts show obvious positive impact over bank deposits, however increasing number of bank branches has no significant impact.

Table 6: Test for Autocorrelation
Breusch-Godfrey LM test for autocorrelation

| Lags(p) | Chi2 | Df | Prob>chi2 |
| :---: | :---: | :---: | :---: |
| 4 | 4.506 | 4 | 0.3419 |

H0: no serial autocorrelation
Whites's test for $\mathrm{H}_{0}$ : homoskedasticity
against $\mathrm{H}_{1}$ : unrestricted heteroskedasticity
$\operatorname{chi} 2(90)=104.29$
Prob $>$ chi $2=0.1440$
Cameron \& Trivedi's decomposition of IM-test

| Source | Chi2 | df | P |
| :--- | :---: | :---: | :---: |
| Heteroskedasticity | 104.29 | 90 | 0.1440 |
| Skewness | 10.38 | 12 | 0.5829 |
| Kurtosis | 2.21 | 1 | 0.1373 |
| Total | 116.88 | 103 | 0.1654 |

## 5. Conclusion

This study finds that interest elasticity of bank deposit is about unity that justifies bank strategy of changing interest rate changes bank deposit by same percentage point holding other factors constant. However, it is needed to investigate whether same thing applies while we separate the type of deposit as
saving deposit and fixed deposit. NPL has negative association with bank deposit. Having such relationship might have some other indirect causes and need further investigations. Opening a new branch, banks can increase the deposit, but this requires some time for making social relation, opening bank accounts and many more. This fact is reflected in the study with lag effect. But, opening new accounts helps to increase bank deposit significantly. One percent increase in bank accounts helps same percentage increase in bank deposit holding other factors constant. Whether this relation holds true or not in each case requires further investigations. This study finds that interest elasticity of deposit as well as percentage change in bank deposit due to percentage change in bank accounts, other things remaining same both are unity. Thus, banks' strategy of increasing interest rate to attract more deposit is less effective and might be costly approach. Thus, banks need to seek other more effective ways to attract more deposit for sustainable banking. Increasing bank accounts can be an effective way of attracting more deposit. But, in Nepal, number of bank accounts outstrips population by a significant number and large section of population is out from banking access at the same time. This is because of multiple accounts opening by the same person. Hence, banks are also recommended to increase banking access and enhance better banking services for sustainable deposit growth.

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Appendix 1: Long Run Output

| Number of Observations: $\mathbf{1 0 9}$ | Root MSE: 0.0091 | R-Squared =0.6397 <br> Adjusted R-Squared |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| O.5946 |  |  |  |  |  |


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