



# Factors Influencing Net Interest Margin In Dominant Indian Banks

*Ada Haqqee<sup>1</sup>, Dr. Pulkit Agarwal<sup>2</sup>*

<sup>1</sup> Research Scholar, Department of Management, Mohammad Ali Jauhar University, Rampur, Uttar Pradesh, India

<sup>2</sup> Head, Department of Commerce, Mohammad Ali Jauhar University, Rampur, Uttar Pradesh, India

## ABSTRACT

The aim of this paper is to determine the factors influencing net interest margin in Indian banking sector. Under its scope, the impact of 4 explanatory variables on net interest margin was analyzed. These explanatory variables consist of both bank-specific and macroeconomic variables. Data for the period between 2012 and 2021 was used in this study. After that, we created a model by using multivariate regression method so as to illustrate the relationship. The major finding in this study is that net interest margin is positively related with operating expenses, credit risk, and inflation. On the other hand, net interest margin is negatively related to economic growth. According to these results, it was determined that banks should try to maintain lower interest margins. This can be done by improving operational efficiency, implementation of standards in management of credit risk and maintenance of favorable economic situations which include lower inflation rate and sustainable economic growth.

**Keywords:** Banking, Net Interest Margin, Commercial Banks, India

## 1. INTRODUCTION

Commercial banks run their business on the phenomenon of accepting deposits and lending money. When these banks accept deposits, they allow a return to the depositors in the form of interest; on the other hand these banks are entitled to a certain amount of earnings in the form of interest they charge from the lenders. The difference between the interest allowed and interest charged by the banks, also known as net interest, fulfill the commercial needs of the banks. For better understanding, net interest is studied in proportion to average interest-generating assets of a bank. This ratio of net interest to assets is called net interest margin (NIM). NIM thus, is not simply net interest income because it studies net interest income relative to total earning assets of a bank. Similarly, it does not include non-interest income like fees, charges, commission etc charged by bank for services other than borrowing and lending. NIM is one important indicator of a bank's profitability and growth. This research paper attempts to study the factors influencing NIM of dominant public sector and private sector in the Indian banking sector.

From the point of view of a bank, a higher NIM means a state of profitability for the bank. When NIM is more, it means that a bank's earnings in the form of interest is more than interest expended by it to its depositors. However from the point of view of an economy, growing NIMs are not a healthy sign of growth as loans gets

costlier with high interest charged by banks and savers getting less returns in the form of low interest paid by banks. Growing NIMs obstructs the channelization process of savings into investment thus limiting capital formation in an economy.

### 1.1 Banking Sector in India

According to Reserve Bank of India (RBI), banking sector of India is sufficiently established and regulated. The country's financial and economic conditions are quite satisfactory in relation to many other countries in the world. A number of studies suggest that Indian banks are generally buoyant and have borne the global ups and downs well. Indian banking industry is also the witness of roll of innovative banking models like payments and small finance banks. The RBI is continually striving to make efforts to help the restructuring of the domestic banking industry.

As per data collected from India Brand Equity Foundation (IBEF), the Indian banking system consists of 12 public sector banks, 22 private sector banks, 46 foreign banks, 56 regional rural banks, 1485 urban cooperative banks and 96,000 rural cooperative banks in addition to cooperative credit institutions. As of September 2021, the total number of ATMs in India reached 213,145. In FY18-FY21, bank assets across sectors increased. Total assets across the banking sector (including public and private sector banks) increased to US\$ 2.48 trillion in FY21. In FY21, total assets in the public and private banking sectors were US\$ 1,602.65 billion and US\$ 878.56 billion, respectively.

## 2. THEORY AND HYPOTHESES DEVELOPMENT

The "dealership model" developed by Ho and Saunders in 1981 is the most accepted theoretical model to investigate the factors influencing determination of net interest margins of banks. As per this model, the banks are considered as "a dealer" i.e., an acceptor of one type of deposit and giver of one type of loan. While doing this job, banks face a prominent type of unpredictability and, consequently, cost. This cost occurs because of the behavior of depositors and lenders. In practice, depositors and lenders usually arrive at different times thereby urging the banks to maintain either a long or short position in the short-term money market. The banks accordingly expect positive interest spread as the price of providing intermediary (depository and/or loan) service in spite of the uncertainty generated by non-synchronous deposit inflows and loan outflows. The literature on bid-ask prices for security market dealers is the basis for development of the dealership model. Banks operate through paying a "bid" price i.e. price for deposits received, and the "ask" price i.e., the price of lending money. Maudos and Fernandez de Guevara, 2004 stated that because of their nature of operation banks have to deal with the demands for loans, and offers of deposits in an uncertain environment characterized by interest rate fluctuations in the money market. Consequently, banks fix their interest rate as a margin relative to the interest rate of the money market.

### 2.1 Operating Expenses and Net Interest Margin

It is evident from theory that as banks pass on their operating costs to their depositors and lenders, change in operating expense is reflected in change in bank NIM. Several studies show that there is a positive relationship between operating expenses and net interest margin of commercial banks (Claessens et al., 2001; Abreu and Mendes, 2003; Carbo and Rodriguez, 2007 and Maria and Agoraki 2010). This is because banks bearing higher average operating expenses may resort to charge higher margins to offset higher operating costs (Maudos and Fernández de Guevara, 2004; Martinez Peria and Mody, 2004). On the other hand, higher operational efficiency may encourage banks to pass lower costs onto their customers in the form of lower loan rates and/or higher deposit rates, thereby lowering interest margin (Claeys and Vander Vennet, 2007).

*H1: There exists a positive relationship between operating expenses and net interest margins, such that when there is an increase in operating expenses there is an increase in net interest margins.*

## 2.2 Credit Risk and Net Interest Margin

Credit risk refers to the risk of failure of repayment of loan on the part of borrower. Credit risk can be in the form of non-repayment of interest as well as principal amount. Theory concludes that banks may be obliged to maintain a larger amount of provisions in order to make for risky loans. And hence, this may force them to charge higher margins in order to compensate for the higher risk of default, ultimately driving to a positive relationship between the two. Angbazo (1997) indicates that default risk is positively associated with bank NIM in US banks. Demirgüç-Kunt and Huizinga (1999) find credit risk measured based on loan to total asset ratio to have positive effect on NIM of 80 developed and developing countries.

**H2:** *There exists a positive relationship between credit risk and net interest margins; such that when there is an increase in credit risk there is an increase in net interest margins.*

## 2.3 Inflation and Net Interest Margin

Inflation is another factor that bears a relationship with interest margins of banks. It is an external factor or can be referred to as a macro factor influencing NIM. The impact of inflation on bank interest depends on whether inflation is likely or unlikely to occur. If inflation is likely to occur, then the banks respond accordingly, thereby increasing the interest rate margins. On the contrary, if inflation is not likely to occur, then banks may not be requiring adjusting their interest rates and so may affect the interest margin negatively because of increased costs occasioned by inflation (Perry 1992). In either case, inflation affects net interest margin. In Latin-American banks, inflation has a negative impact on bank interest margins (Martinez and Mody 2004). Inflation and interest margin of Tunisia banks indicates a negative relation (Samy 2003)

**H3:** *There exists a positive relationship between credit risk and net interest margins; the higher the inflation rate the higher is the net interest margin.*

## 2.4 Economic Growth and Net Interest Margin

On the basis of literature available, it can be said that researchers are of both the opinions that economic growth may or may not impact NIMs of banks. Some studies argue that economic growth has a positive effect on interest margins (Claessens et al., 2001), others do not find any effect in cross country studies of European countries (Abreu and Mendes, 2003; Maria and Agoraki, 2010).

We argue that economic growth directly or indirectly influences the borrowing and lending patterns in banks in an economy and therefore is thought of as a significant variable in the determination of bank interest margins. An increase in economic growth would boost up business activity leading to better performance among the borrowers. Improved performance lowers the amount of bad loans, and so the risk premium is reduced. This situation brings the banks in a position to reduce their interest margins.

Similarly, slow economic growth reduces the debt repayment capacity of the borrowers and an increase of credit risk is expected, consequent to which interest margin increase (Maria and Agoraki, 2010). In this case, we hypothesize that:

**H4:** *Economic growth is negatively related to interest margins, such that as economy grows, the interest margins decline.*

## 3. RESEARCH METHODOLOGY

### 3.1 Data

Out of the total banks operating in the Indian banking sector, the dominant public sector and private sector banks holding the maximum amount of total assets are selected from both the sectors. These banks constitute a significant portion of the Indian banking sector. The banks selected are namely The State Bank of India, Punjab National Bank, Bank of Baroda, HDFC Bank, ICICI Bank and Axis Bank. These banks selected represent both public and private banking sector of India. The period of study is 2012-2021. In total 6 commercial banks were



used giving 60 firm year observations. Secondary data used for the study was derived from varied sources including Reserve Bank of India, annual reports and financial statements of the selected banks.

### 3.2 Variables

In this study, we have estimated the factors affecting NIM of dominant Indian commercial banks. The dependent variable is Net Interest Margin (NIM), which is determined by a set of bank specific and macroeconomic factors. NIM is the net interest income relative to total earning assets of a bank. The explanatory bank specific factors taken for the study include operating expenses and credit risk. The macroeconomic predictors of bank NIMs -- inflation and economic growth are taken to estimate the NIM. Table 1 gives a description of variables used in the study.

**Table 1. Description of Variables used in the study**

Notation	Variable	Description
<b><i>Dependent Variable</i></b>		
<b>NIM</b>	Net Interest Margin	Net Interest Margin (%)
<b><i>Independent Variable</i></b>		
<b>OE</b>	Operating Expenses	Ratio of Operating Expenses to Total Assets (%)
<b>CR</b>	Credit Risk	Ratio of Advances to Total Assets (%)
<b>INF</b>	Inflation	Annual Rate of inflation (%)
<b>GDPGr</b>	GDP Growth Rate	Annual Economic Growth Rate (%)

### 3.3 The Model

To understand how NIM is influenced by various bank-specific factors and macro economic factors, we have employed the panel regression model for the estimation of the model. The general model to be estimated is of the following linear form:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_p X_{ip} + \varepsilon \quad \text{for } i = 1, 2, \dots, n \quad \text{-----Equation (1)}$$

Here,  $Y_i$  is the dependent variable;  $X_{i,t}$  denotes a set of exogenous regressor that includes the independent variables affecting  $Y_{i,t}$ ;  $\beta_0$  is the intercept and  $\beta_1, \beta_2, \dots, \beta_p$  are analogous to the slope in linear regression equation and are also called regression coefficients. They can be interpreted the same way as slope. It indicates a change in the dependant variable as a result of a unit change in explanatory variables keeping other independent or explanatory variables constant.  $\varepsilon$  denotes the error term.

The general specification of model (1) is as follows:

$$NIM_{i,t} = \beta_0 + \beta_1 \text{Operating Expenses}_{i,t} + \beta_2 \text{Credit Risk}_{i,t} + \beta_3 \text{Inflation}_{i,t} + \beta_4 \text{Economic Growth}_{i,t} + \varepsilon_{i,t}$$

In the above equation, the dependent variable is 'net interest margin'  $NIM_{i,t}$  for  $i$ -th bank and  $t$ -th year determined by explanatory variables  $X_{i,t}$  i.e., bank specific factors [operating expenses and credit risk] and macro economic factors (inflation-IR and economic growth).  $\beta_s$  are model parameters.

In its abbreviated form, the model can be put as:

$$NIM_{i,t} = \beta_0 + \beta_1 OE_{i,t} + \beta_2 CR_{i,t} + \beta_3 INF_{i,t} + \beta_4 GDPGr_{i,t} + \varepsilon_{i,t}$$

To further verify the model fitness i.e., the strength of relationship between the dependent variables and independent variables, the above mentioned model is tested through regression analysis. Table 2 shows the results of the strength of relation between the two set of variables.

**Table 2. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.895a	.801	.786	.26909

Predictors: (Constant), GDPGr, OE, INF, CR

The Multiple R for the relationship between the set of independent variables and the dependent variable is 0.895, which would be characterized as strong using the rule of thumb that a correlation less than or equal to 0.20 is characterized as very weak; greater than 0.20 and less than or equal to 0.40 is weak; greater than 0.40 and less than or equal to 0.60 is moderate; greater than 0.60 and less than or equal to 0.80 is strong; and greater than 0.80 is very strong. Table 2 shows the output for model fitness. The R coefficient of 0.895 indicates that the predictors of the model which are OE, CR and GDPGr have a correlation of 89.5% with the dependent variable of net interest margin that means there is a strong relationship between the set of independent variables and dependent variable (NIM). The R square also called coefficient of determination of .801 indicates that the model can explain 80.1% of the variations in the net interest margin of selected dominant banks in India and there are other factors which can only explain 19.9% of the variations in net interest margin. This shows that the independent variables (OE, CR and GDPGr) of this study are significant predictors of the NIM of selected dominant banks of India.

On running the ANOVA test, the following results are obtained as shown in Table 3.

**Table3. ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15.991	4	3.998	55.211	.000 <sup>b</sup>
Residual	3.983	55	.072		
Total	19.974	59			

a. Dependent Variable: NIM

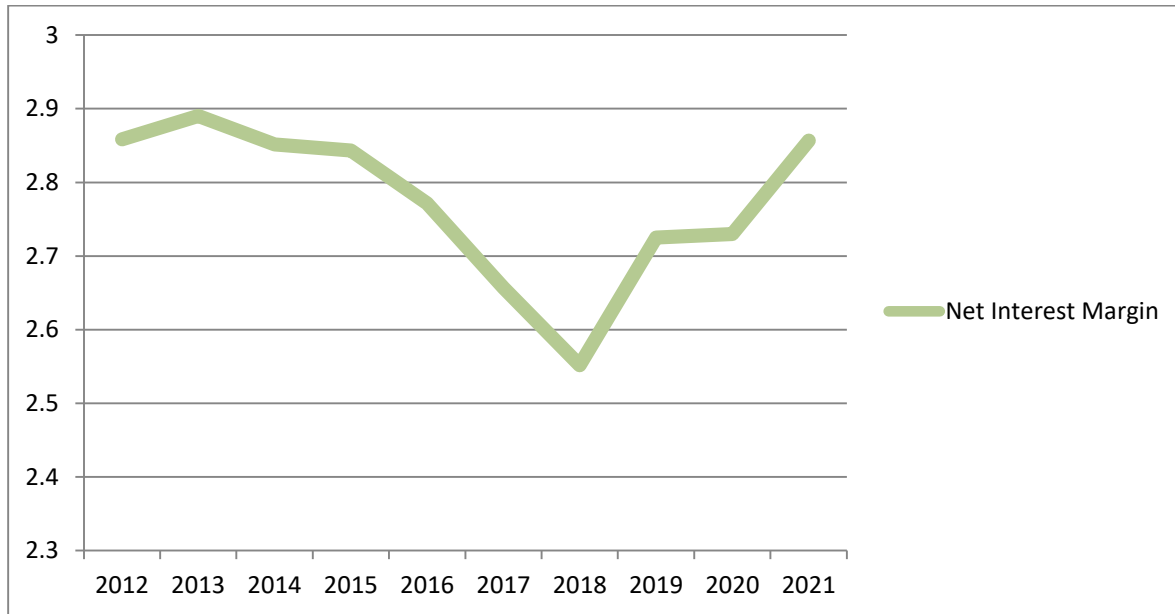
b. Predictors: (Constant), GDPGr, OE, INF, CR

Table 3 shows that variations in the interest margins can be explained by the model to the extent of 15.991 out of 19.974 or 80% while other variables not captured by this model can explain of the 20% (3.983 out of 19.974) of the variations in financial performance. The F value of the model produces a p-value of 0.000 which is significantly the same as zero. A p-value of 0.000 is less than the set level of significance of 0.05 for a normally distributed data. This means that the model is highly significant in explaining performance of the PSBs of India.

#### 4. EMPIRICAL RESULTS

The trend of the net interest margin of selected dominant Indian banks can be witnessed from figure 1. In a period of 10 years, an average NIM for the selected banks has been ranging from 2.55% to 2.86%. There has been an increase or decrease in this rate over the years.

**Figure 1. Net Interest Margin of Dominant Indian Banks**



The description of statistics of variables that are used in the estimation of determinants of NIM is presented in Table 4. The descriptive statistics both the dependent and explanatory variables for the time period between 2012 and 2021 is presented in the form of mean, standard deviation, minimum and maximum.

**Table 4. Descriptive Statistics of Dependent and Independent Variables used in the study**

Variables	N	Minimum	Maximum	Mean	Std. Deviation
NIM	60	1.81	3.94	2.7735	.58184
OE	60	1.07	2.80	1.7997	.34882
CR	60	53.48	67.48	60.5860	3.33138
INF	60	3.33	11.06	6.3360	2.53593
GDPGr	60	-7.96	8.26	5.0170	4.53347
Valid N (listwise)	60				

The results show that the net interest margin (NIM) ranges from 1.81 to 3.94, with a mean NIM value of 2.77. Similarly, the minimum and maximum values of the independent variables range from low to high. The mean and standard deviation values of the variables suggest that there is variation between the two.

Correlation is applied on NIM and other variables to find out if there exists any kind of association among them. The correlation matrix with correlation coefficients of the variables used is shown in Table 5. It is evident from the table that NIM is positively related with operating expenses (OE), credit risk (CR) and inflation (INF) and on the contrary it has a negative association with GDP Growth rate. Also, it can be concluded from the correlation results NIM bears a high level of significance of correlation in case of both bank- specific factors and low level of significance of correlation in case of macroeconomic factors.

Table 5. Correlation Matrix

		NIM	OE	CR	INF	GDPGr
NIM	Pearson Correlation	1	.831**	.515**	.140	-.060
	Sig. (2-tailed)		.000	.000	.285	.651
	N	60	60	60	60	60
OE	Pearson Correlation	.831**	1	.263*	.055	.010
	Sig. (2-tailed)	.000		.043	.674	.941
	N	60	60	60	60	60
CR	Pearson Correlation	.515**	.263*	1	.093	.137
	Sig. (2-tailed)	.000	.043		.479	.298
	N	60	60	60	60	60
INF	Pearson Correlation	.140	.055	.093	1	-.086
	Sig. (2-tailed)	.285	.674	.479		.513
	N	60	60	60	60	60
GDPGr	Pearson Correlation	-.060	.010	.137	-.086	1
	Sig. (2-tailed)	.651	.941	.298	.513	
	N	60	60	60	60	60

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

We apply panel regression to further investigate the relationship between NIM and its determinants. Here, NIM is the dependent variable and the other variables including OE, CR, INF and GDPGr are independent variables.

Table 6. Panel Regression , Time Period: 2012-2021

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2.959	.640		-4.620	.000
OE	1.237	.104	.742	11.877	.000
CR	.058	.011	.330	5.208	.000
INF	.014	.014	.059	.976	.333
GDPGr	-.014	.008	-.107	-1.745	.086

a. Dependent Variable: NIM

The regression estimates of the panel regression model also give results similar to correlation. NIM is positively associated with operating expenses (OE), credit risk (CR) and inflation (INF). The relationship between NIM, OE and CR is statistically significant as the p-value  $< 0.05$  in these cases. The relationship between NIM and INF is however insignificant as p-value  $> 0.05$ . On the other hand, GDPGr exhibit negative association with NIM. Their association is also statistically not significant as p-value  $> 0.05$ .

## 5. DISCUSSION

In this paper, we have examined the impact of factors affecting NIM of selected Indian banks. Using a set of bank specific and macro economic variables we analyze their effect on the net interest margins of selected banks in India. The results suggest that NIM is more or less influenced by the various determinants take under study.

Results also suggest that increase in operating cost is likely to cause an increase in NIM. The finding that there is a positive relationship between operating expense and net interest margin is consistent with our hypothesis and various other studies. Higher margins may be opted by banks that bear higher average operating expenses to offset their higher transformation costs, implying a positive relationship (Maudos and Fernández de Guevara, 2004; Martinez Peria and Mody, 2004). On the contrary, banks may lower their interest margins in case of low operational costs as it may enable banks to pass down lower costs to their customers in the form of reduced rates on loans and/or higher rates on deposit, thereby lowering interest margin (Claeys and Vander Venet, 2007).

Similarly, the association between credit risk and NIM is found to be positive and statistically significant, which means that higher the credit risk higher is the margin kept by banks for making up that risk. This finding supports our hypothesis and findings of scholars (e.g. Angbazo, 1997; Demirgüç-Kunt and Huizinga 1999; Abreu and Mendes, 2003; Carbo and Rodriguez, 2007; Maria and Agoraki 2010) that credit risk affects net interest margin positively. In order to make risky loans, a higher amount of provisions are to be maintained by banks. In turn, this may force them to charge higher margins in order to compensate for the higher risk of default, leading to a positive relationship (Drakos, 2002; Maudos and Fernández de Guevara, 2004)

The results also show that inflation is positively associated with NIM of banks but the relationship is not statistically significant. This finding is consistent with our hypothesis. If inflation is unlikely to happen and banks are sluggish in adjusting their interest rates, then there is a possibility that bank revenues may increase slower than bank costs and hence bank margins may be adversely affected.

Economic growth is found to be negatively related with NIM and this relationship is largely significant in all the estimations. This proves that the more the economic growth the lower is the net interest margins. Our hypothesis is consistent with the results. The relationship can be explained by the theory that when there is low economic growth the debt servicing capacity of domestic borrowers weakens which leads to an increase of credit risk (Maria and Agoraki, 2010). On the other hand, when economic growth rises, it is expected that bank's income may also rise because of more lending and lower default rates. Therefore, banks lower their interest margins in response to that.

## 6. CONCLUSION

In this paper, we analyzed the bank-specific and macroeconomic determinants of interest rate margin. We find that operating expense has a positive and significant impact on net interest margin of the selected commercial banks of India. Credit risk tends to be positively associated with net interest margin. We found that the higher the inflation the larger the net interest margin. Similarly, economic growth impacts net interest margin negatively.

The study therefore recommends that banks should try to register lower interest margins. Cost reduction strategies should be adopted by Commercial banks to reduce their operating expense so as to enhance their operational efficiency. To prevent banks from taking excessive risks, they should strive to implement standards in credit risk management (CRM). Policy makers should try to maintain favorable economic situations which



include lower inflation rate and sustainable economic growth which will help reduce interest margins set by bank. Overall, the results provide evidence that the interest spread in commercial banks is determined by bank specific variables and macroeconomic variables.

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