

**Determinants of Net Interest Margins: A Comparative Study of Emerging Markets (Pakistan, India and Bangladesh)**

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**CERTIFICATE OF APPROVAL**

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## **Certificate**

This is to certify that Adeela Khalil has incorporated all observations, suggestions and comments made by the external evaluators as well as the internal examiners and thesis supervisor. The title of her Thesis: Net Interest Margins: A Comparative Study of Emerging Markets (Pakistan, India and Bangladesh).

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Dr. Jaleel Ahmed Malik

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## **Dedication**

*Dedicated from core of my heart to my beloved parents Mr. & Mrs. Khalil Khalid.*

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All the praises are for the Allah Almighty; the most beneficent and the most merciful; who granted man with knowledge. All salutations are upon the Prophet (P.B.U.H.) whose teachings enlighten my thought and thrive my ambitions.

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## ABSTRACT

The study focused to check the effect of Leverage Risk, Credit Risk, Implicit Interest Payment, Non Interest Bearing Reserve and Management Efficiency on Net Interest Margin of the banks of Pakistan, India and Bangladesh.

This study applies Generalized Method of Moment GMM, descriptive analysis, correlation and panel regression model is used to explore the impact of risk factors ( leverage risk, implicit interest payment, non interest bearing reserve, management efficiency, and credit risk) on net interest margin which banks face in providing immediacy. A descriptive analysis of data is performed to get sample characteristics. A set of 41 banks of Pakistan, 38 banks of India and 27 banks of Bangladesh was taken which afterwards shrinks to 33, 37 and 18 banks of Pakistan India and Bangladesh respectively.

The results show that credit risk has negative and significant impact on the net interest margin. Implicit interest payment positively and significantly effect on net interest margin. Leverage risk has significant and negative impact on the net interest margin. Management efficiency has positive and significant impact on the net interest margin. Non-interest bearing reserve are also positively and significantly impact on net interest margin.

**Keywords:** Net interest margin, leverage risk, implicit interest payment, non interest bearing reserve, management efficiency, and credit risk.

## **Chapter 01**

### **Introduction**

Against the past few decades of increasing diversity of financial institution, progress in technology and financial instruments, it become an important task for a country's economic policy to ensure the stability of banking sector. Net interest margin (NIM) is the most important criteria for checking the stability and effectiveness of banking operations. Banks take a lot of interest in their net interest margin (NIM) because banks lend money on one rate and pay interest to the depositors on another rate.

The measure of an investing strategy's success is net interest margin (NIM). Net interest margin (NIM) can be explain as the performance that examine the success of a bank's investment decisions in contrast to its debt situation. A positive net interest margin means that bank investment decision paying more then its cost on the other hand if net interest margin is negative then investment strategy of a bank cost more then it earn. Negative of net interest margin shows that bank is unable to take rite decision.

If the non performing assets of a bank is rising the interest earned by the bank would fall that leads to decline in net interest margin. High net interest margin increase the profitability of a bank. A negative of net interest margin (NIM) shows that lender was unable to make right use of its assets. So this is necessary to examine that what are the determinant that can increase or decrease the net interest margin of banking sectors of Pakistan, India and Bangladesh.

## 1.1 Theoretical background

This study is about the relationship between bank net interest margin and leverage risk, credit risk, implicit interest payment, non interest bearing reserves and management efficiency. This analysis follow the model of net interest margin drawn by Ho and Saunders (1981); McShane & Sharp (1985) and Allen (1988). This models that the above determinant of net interest margin effect prices of products of banks.

Net interest margin is the ratio of net interest income to average earning assets and this net interest margin is an important factor in the profitability of bank, the effects of change of interest rate of market and default on net interest margin is not well documented in literature. The net interest margin describe both volume and mix of assets and liabilities. This study is going to extend the model of Ho and Saunders by including leverage risk, credit risk, implicit interest payment, non interest bearing reserves and management efficiency ( Angbazo, 1997).

When companies are unable to make the required payments on their debt obligation then there is a risk of default or we can say that when a company is unable to payback its liabilities it is said to be default (Kasman et al. , 2010). Interest rate risk arises by the fluctuation of interest rates.

Leverage risk explain that how much amount that a company borrowed to run the complete project. The amount of money that a bank borrow to finance the assets of an organization is leverage risk. (Angbazo, 1997). Credit risk is that risk that may arise when the borrower that take loan from banks will not repay that loan at that time there would be a risk of credit it also called debtor default. Risk of credit may be on credit card, mortgage loan or line of credit ( Maudos & Guevra, 2004).

Implicit interest payment shows the extra amount to the depositors that are collected through services charges remission or any other type of transfer fees. If implicit interest payment increases net interest margin increase so its predicted coefficient sign is positive (Kasman & et al., 2010).

Non interest bearing reserves are those reserve that we keep with us or submit it to state bank just for a security and we don't receive any interest or we give any loan on it (Angbazo,1997). A bank is called management efficient if its assets are efficient and give more profit and liquidate easily (Kasman & et al., 2010).

## **1.2 Problem statement**

There are minimal literature available in the emerging economies to check the impact of determinants of net interest margin on the emerging markets banks. This study is going to check the impact all the above mention variables on net interest margin of the banks of emerging markets. This study would extends the model of Ho and Saunders by including all the determinants of net interest margin and it would investigates whether the risk effects are heterogeneous across bank size classes or not. Studies on NIM of banks of developing countries are scanty. This study can serve as a starting point and with the help of this study further research can be done. It may also be helpful for bank decision makers as they can focus on major banking activities. It could help the management of commercial banks in creating better financial strategies, and they can attain their required planned financial performance.

### **1.3 Research questions**

This study has following research questions

- What are the determinants of Net Interest Margin in emerging economies of South Asia?

### **1.4 Objectives of the study**

This study aim with the following objectives.

- To provide insight about the role and impact of determinants of Net Interest Margins in banks of emerging markets like Pakistan, India, and Bangladesh.

### **1.5 Significance of the study**

This study is unique in a way that it addresses the factors that are influencing the net interest margin of scheduled commercial banks in emerging markets like Pakistan, Bangladesh, and India. The study demonstrates the impact of interest rate volatility and financial development indicators on banking spreads. This study for the first time collectively going to investigate on banks of emerging markets like Pakistan, India and Bangladesh that either leverage risk, credit risk, implicit interest payment, non interest bearing reserves and management efficiency have any impact on net interest margin or not.

Investors on the other hand can take help from this study at the time of their investment decisions. Portfolio managers and policy makers can also use this study at the time of their policy making decisions. This study is going to fill the literature gap as a very few literature is available on emerging markets like Pakistan, India and Bangladesh and it can also give direction

to other future researchers. Studies on NIM of banks of developing countries are scanty. This study can serve as a starting point and with the help of this study further research can be done.

It may also be helpful for bank decision makers as they can focus on major banking activities. It could help the management of commercial banks in creating better financial strategies, and they can attain their required planned financial performance. The findings of this paper can be helpful for bank management, policy makers and share holders as well.

## **1.6 Organization of the study**

The first chapter talks about the detailed introduction of net interest margin and its determinant. In this chapter theoretical background of the variables has been discussed and also discuss that why this study is important to conduct.

Chapter number two contained a detailed literature review of financial sectors and net interest margin. In this chapter previous researches related to net interest margin and default risk, liquidity risk, leverage risk, size, implicit interest payment, non interest bearing reserves, management efficiency and credit risk that are the determinant of net interest margin are also discussed.

Third chapter is comprises of methodology. In this chapter one can find the countries on which research has been done and the sample size that have been taken. Sampling techniques has been discussed in this chapter and the measurements that have been taken to find out the ratios of independent variables. The methods that has been used to run the final results are also mention in this chapter. Correlation table and the relation of variables with each other are also discussed in this chapter. Sample classification, list of variables and there sources are also mention in chapter three. Descriptive statistics has also been discussed in it.



Forth chapter includes results and empirical discussion of net interest margin and its determinants. Conclusion and future recommendations has been discussed in chapter number five. It has been discussed that what are the findings of this study and how it would be helpful for future researchers. All the references are mentioned at the end of the document.

## **Chapter 02**

### **Literature Review**

A detailed literature review of financial sectors and net interest margin has been discussed in brief review of literature. In this chapter previous researches that are related to net interest margin and default risk, liquidity risk, leverage risk, size, implicit interest payment, non interest bearing reserves, management efficiency and credit risk that are the determinant of net interest margin are also been discussed. On the other hand hypothesis of each variable has also been drawn at the end of the discussion.

#### **2.1 Brief review of literature**

Commercial banks of any country play a very important role in economic resource allocation. Banks work by borrowing the funds from different institution, business, and governments and lend it to borrowers. Economies of any country run with the help of banks of that country. Banks are the safe place to store extra cash. Bank is one of the main key drivers in any economy. For any economy of a country the role of banks are very important either it is domestic or foreign bank (Williams, 2007).

On the other hand it is also necessary that either bank are working properly or not. A lot of factors affecting the efficiency of banks which cause net interest margin to increase or decrease. Liquidity management plays a vital role in the performance of banks (Guru and Staunton , 2002).

According to Tarus, Chekol and Mutwol (2012) commercial banks plays a very important role in any economy banks work in a way that they receive amount from public or from other

banks and they use that money for generating more money by giving credit facilities. Similarly the money that the bank generate increase the net interest margin. Lin and et al., (2012) explained that net interest margin play a significant role to the banking industry. Net interest margin is the performance of any bank that shows how successful the bank is and how much the bank is generating profit either the return is higher or the debt or liabilities are higher.

Net interest margin is very important element of the profitability of banks. The net interest margin also reflect both volume and mix of liabilities and assets and in this way set by the banks to cover the cost of inter mediation (Angbazo, 1997). Net interest margin is one of the key measures to check the profitability of any bank. Net interest margin is basically the interest income that bank generates and the amount of interest that is paid to the lenders. If the net interest margin of bank is high the more profit bank would earn and bank would be considered as more stable (Ongore & Kusa, 2013)

Growing diversity of financial instruments, increasing interconnection of financial institution and increasing technological progress, ensuring the stability of banking system and it become an important task for economic policy of any country. Net interest margin is the most important criteria for evaluating the effectiveness and stability of bank operation and for asset structure optimization (Saksonova, 2014).

Meshesha (2016) and English (2002) studied on NIM net interest margin and the supervisors of different banks spent a lot of time and their efforts and the results shows that commercial banks of 10 countries manage their volatility exposure in yield curve in a way that limit the effect on net interest margin. So we can say that the changes in net interest margin may

be a very important source of uncertainty in bank profitability and it may have very bad effects for some institutions.

Banks that have high net interest margins are those who have high capital. On the other hand bank's net interest margin is high due to the loans because loans have positive and significant impact on net interest margin and banks generate profit from that income ( Naceur, 2003).

Fungacova & Poghosyan (2011) studied the determinants of net interest margin of Russia. There are a lot of variables that contributes towards increase or decrease of net interest margin. In this study author used most common variables of net interest margin that are credit risk, liquidity risk and size. Credit risk is showing negative relation with net interest margin while liquidity risk is also a very significant determinant of net interest margin for domestic owned banks and for foreign owned bank. Liquidity risk have a negative impact on net interest margin and the state owned banks rely on state for their liquidity problems. The results of determinants of net interest margin of Russia are in line with the determinants of net interest margin of other countries.

The banking sector part assumes a basic part in financial development, as it is the fundamental component in the directing of assets from banks to borrowers. In this sense, it is significant that this work of inter mediation by the banks is completed with the most minimal conceivable cost keeping in mind the end goal to accomplish more noteworthy social welfare. Clearly, the lower the banks' advantage edge, the lower the social expenses of money related inter mediation will be.

The decrease of the interest margin that has happened as of late in the managing an financial firms of the European Union is normally deciphered because of the development of rivalry. Be that as it may, in the light of the hypothetical model, keeping money edges don't depend just on the power of rivalry, additionally on different factors, for example, premium hazard, credit chance, the development of working expenses, and so forth. A diminishing in keeping money edges is subsequently perfect with a lessening in the level of rivalry if the impact of the last is checked by the impact of the development of alternate determinants of the premium edge.

Banks concede credits which are liable to the danger of default. Banks painstakingly select and screen their borrowers. All things considered, some of these borrowers can't make their interest installments and can't pay back their obligations. This is particularly valid for unsafe credits which have been given to firms in repeating ventures or which are not very much collateralize.

In this examination, we not just consider the normal misfortunes of the credit introduction, additionally evaluate a credit chance premium. Besides, banks hold bonds which likewise open them to credit chance and ought to consequently acquire them a conventional compensation. The banks' term change comprises in giving long haul advances and taking in short term stores.

As the term structure of financing costs tends to increment with development, term change is favorable for banks. Be that as it may, if the loan cost level rises, banks' profit from term change diminish on the grounds that rising financing costs as a rule greaterly affect subsidizing costs than on premium pay. These distinctions in affect are because of the way that the developments of banks' liabilities are normally shorter than the developments of their advantages. This implies inside a given time traverse of, say, one year, the offer of liabilities that

must be recharged at what are currently negative conditions is bigger than the new business on the advantage side which profits by the more good financing costs.

Another fundamental capacity of banks is to perform liquidity and installment administration for their clients. They complete cash exchanges for their clients, they give trade out the ATM's, and they empower their clients to store their cash. This capacity additionally incorporates the authoritative costs when clients apply for a line of credit. Regularly, clients don't pay straightforwardly for these administrations, yet pay for them in a roundabout way as far as lessened financing costs on their stores and stamp ups on the advances.

For example, customers' money set in current records is compensated just at a low rate (if by any stretch of the imagination), while the compensation of time stores is outfitted to capital market rates. Most papers that arrangement with banks' net premium edge infer subjective explanations: for example, that a bank's market control is decidedly corresponded with its net premium edge. By differentiate, our paper goes for putting forth quantitative expressions: for example, that the profit from term change represent a specific rate of a bank's net premium edge.

## **2.2 Credit risk and net interest margin**

Credit risk is a risk that arises when any borrower fail to pay his debt. It cause increase in collection cost. This loss could be complete or partial. Credit risk losses take place by a number of ways. When a company is unable to pay its debt or floating charges the risk of credit take place. When a customer of a bank or any business does not trade invoices the risk of credit take place. When any government that issue bonds does not make payments on coupon when due at that time risk of credit take place (Simkovic, 2016)

They studied about the relationship between bank performance and the steps that have been taken to improve bank performance (bank efficiency) and net interest margin. The results showed that the effect of credit risk on performance of banks is negative. It also seems that higher liquid assets reduce the productivity of bank and its efficiency (Brissimis, Delis & Papanikolaou 2008)

According to Tarus, Chekol and Mutwol (2012), if the credit risk will be higher the higher will be the net interest margin hence the effect of credit risk is positive on net interest margin. While Fernandez, Joaquin and Juan (2003) explains the modeling of the net interest margin and the influence of operating cost by using direct measure to capture the competitive condition. They found that interest margin fall due to the relaxation in competitive conditions e.g. increase in market power, it reduces the risk of interest, risk of credit and the risk of operations. Hence by reducing risk of interest, risk of credit and risk of operations bank interest margin fall. By the change of income in European banks an increase in banking commissions and reduction in implicit interest payment take place that cause in reduction of net interest margin.

Lin et al., (2012) explains that according to their observations management efficiency, IIP payment of implicit interest and risk of credit are the variables that increase the net interest margin while liquidity risk decline leads to slowdown net interest margin. Kasman et al., (2010) explain that bank interest margin is positively related with credit risk. It also shows that bank demand higher rate of interest to overcome unexpected risk of credit. On the other hand implicit interest payment that is another determinant of net interest margin significantly and positively related with net interest margin, due to this bank gave a free banking service which in turn leads to higher interest margin.

Hawtrey and Liang (2008) worked on the empirical determinants of banks net interest margin by using representative bank approach; credit risk is positively related to bank interest margin. Bektas (2014) introduced two unique measures instead for net interest margin he took 24 commercial banks for the period 2003 to 2009 from a close and small bank market and its finding showed that credit risk is positively and significantly related with bank spread and net interest margin. The study showed that banks behave differently in determination of net interest margin and interest rate spread.

Anbar and Alper (2011) said that banks could enhance their ratio of profit by increasing the size of bank and decreasing the ratio of credit because ratio of credit and size of loans have a negative impact on the profitability of bank while the higher rate of interest leads to higher bank profitability. Fungacova & Poghosyan (2011) studied the determinants of net interest margin of Russia and conclude that credit risk is showing negative relation with net interest margin.

Hence above literature proposed following hypothesis which explain the relation between net interest margin and its credit risk.

*H<sub>1</sub>: There is a negative relationship between credit risk and net interest margin.*

### **2.3. Size and net interest margin**

Abreu and Mendes (2001) studied NIM net interest margin of banks and profit of some of the European countries and according to the observations inflation, exchange rate, economic growth, bank size and capitalization are the variables that effect bank interest margin. Naceur (2003) also worked on banks profitability and he suggest that high profitability and bank interest margin linked with those banks that keep high ratio of capital while size is a main variable that is negatively and significantly related with net interest payment.



When the data of top fifteen banks of Pakistan has been taken, the results shows that there are a lot of factors that affect net interest margin of bank, it may be internal factors or external factors. The financial sector of Pakistan is mostly dominated by commercial banks. One of the main determinants of bank profitability is size. Size and bank profitability showed a direct relationship. Net interest margin is the interest income generated by the banks and the amount of interest paid to the lenders. It can also express as the percentage of interest that a bank earn. There are a positive relation between banks and size. The banks that are larger in size are able to earn more profit then those banks that are smaller in size. The size of bank has an independent relationship with profitability of bank ( Gul, Irshad and Zaman 2011)

When US owned commercial banks has been taken into observation the results showed that efficiency and bank size are the significant factor that are positively impacting on net interest margin. The total assets of the bank are representing bank size (Kosmidou et al.,2005). Banks that are owned by foreign countries are more efficient then and the efficiency of a bank reduce when size of a bank increases. This is a very puzzling result that large size of a bank reduces efficiency. Foreign banks that are smaller in size are more efficient so there is an inverse relation between efficiency and bank size (Bonin et al., 2005).

Size of the banks is an independent variable. Size also related with economies and dis economies of scale. Mostly total assets of the bank are termed as the size of the bank. The impact of size is negative on net interest margin; it shows that if the size of a bank is large, net interest margin of the bank is low. Larger banks shows negative net interest margin. The results of this study suggest that if the banks reduce their size the net interest margin would increase (Naceur., 2003).

Ben and Goaiied (2008) found that size impact negatively on profitability that shows that Tunisian banks are working above their optimum level while the macroeconomic variables have no impact on profitability of banks. Hamadi and Awdeh (2012) explain about the size of domestic banks he said that size has negative impact on interest margin and for the foreign banks they found that size have a positive and significant impact on net interest margins. Size has different effects on net interest margin in case of domestic and foreign banks.

In Malaysia or other Islamic countries there is high profitability level and tremendous growth of banks. They have taken 10 banks to investigate the impact of different variables on profitability of banks. The result showed that size is a very important variable that affect the profitability of banks (Abduh & Idrees , 2013)

Zhou and Wong (2008) found that the interest margin of china's commercial banks has declined over time and the size of operation negatively affects the interest margin. If we compare china with EU community china is less competitive. If the banks of china would not improve the management efficiency and quality, the banking stability of china could be at risk.

Hence above literature proposed following hypothesis which explain the relation between net interest margin and size..

*H<sub>2</sub>: There is a positive relationship between size and NIM.*

#### **2.4. Liquidity risk and net interest margin**

Liquidity refers to the ability of any bank that how the bank fulfill its short term obligation. Any asset or security that cannot be traded quickly cause liquidity risk. The level of liquidity is positively related with the profitability of bank if the bank is having more liquid

assets it can't earn more profit. So, it is necessary to manage the liquidity. But on the other hand when they conclude the results of their research management efficiency has a significant effect on net interest margin while the effect of liquidity is not so strong on the performance of commercial banks of Kenya. This evidence is supported by efficiency structure theory which shows that management efficiency leads to higher performance (Guru and Staunton 2002).

Liquidity of a bank is defined as the ratio of operational assets to bank liabilities. When liquidity of a bank is increases the liquidity risk of the bank decreases, which reduces the net interest margin due to lower liquidity premium that are charged on loans. So this variable is expected to negatively relate to net interest margin. Afanasieff & et al. (2002). They studied about the relationship between bank performance and the steps that have been taken to improve bank performance (bank efficiency) and net interest margin. The results showed that higher liquid assets reduce the productivity of bank and its efficiency (Brissimis, Delis & Papanikolaou 2008).

Hamadi and Awdeh (2012) explained about the liquidity efficiency of domestic banks they said that these liquidity risks have a positive and significant impact on NIM bank's net interest margins. Tarus, Chekol and Mutwol (2012), showed that lower liquidity risk is positively and significantly related to NIM net interest margin and spread, 'on the other hand, interest rate risk has a negative effect on net interest margin because when there is a fluctuation in interest rates of any bond it would be more riskier.

Fungacova & Poghosyan (2011) studied the determinants of net interest margin of Russia and conclude that liquidity risk is also a very significant determinant of net interest margin for domestic owned banks and for foreign owned bank. Liquidity risk have a negative impact on net

interest margin and the state owned banks rely on state for their liquidity problems. The results of determinants of net interest margin of Russia are in line with the determinants of net interest margin of other countries.

Liquidity risk are positively and significantly related to NIM net interest margin and spread on the other hand interest rate risk has a negative effect on net interest margin (Bektas 2014) . If a bank has liquid assets it reduces the risk of bank that the bank don't have sufficient cash to meet new loan demands and deposit withdrawals. So, if the proportion of liquid assets increases the bank liquidity risks decrease (Doliente 2005). This study showed that banks behave differently in determination of net interest margin and interest rate spread.

There are plenty of studies with respect to the determination of net interest margined spread in the past writing. Gounder & Sharma (2012) found that liquidity risk is negatively related with net interest margin. Liquidity is also a specific factor so when liquidity increase net interest margin increase and when liquidity decrease net interest margin also decrease (Olweny & Shipho, 2011)

Hence above literature proposed following hypothesis which explain the relation between Net Interest Margin and its liquidity risk.

*H<sub>3</sub>: There is a positive relationship between liquidity risk and net interest margin.*

## **2.5 Management efficiency and net interest margin**

Angbazo (1997) and Guru, Staunton and Balashanmugam (2002) explained that why some of the banks in Malaysia are more successful than the other banks. They checked that what are the reasons behind the variation in the profitability of different banks ( some of the banks making more profit than others). They studied the determinants of successful commercial banks to improve profitability. After all the analysis they found that expense management efficiency is

one of the most important determinant of bank profitability. If the banks focus on their management efficiency they can improve their net profit. In this study profit of banks depend upon interest income and interest expense.

Guru and Staunton (2002) identify the determinants of successful commercial banks, so that they can give guideline to improve profitability. They divide the determinants into two main categories namely those that can be control by the management. Management efficiency found to be the most important determinant for commercial bank profitability. The banks that are having good management efficiency are consider to be more profitable and having high net interest margin (Garcia et al., 2009)

They studied about the relationship between bank performance and the steps that have been taken to improve bank performance (bank efficiency) and net interest margin. The results showed that bank efficiency has a positive impact on net interest margin. While the effect of credit risk on performance of banks is negative. It also seems that higher liquid assets reduce the productivity of bank and its efficiency (Brissimis, Delis & Papanikolaou 2008)

Zhou and Wong (2008) showed that the net interest margin of China's commercial banks decline over time. If the banks of china would not improve the management efficiency and quality, the banking stability of china could be at risk. Kasman et al. (2010) found that higher management efficiency encourages banks to offer higher deposit rates and low rates of loans to their clients. Banks management efficiency along with operating cost plays an important part in net interest margin. Banks can reduce their risk exposure by holding those assets that are highly liquid form.

Hawtrey and Liang (2008) worked on the empirical determinants of banks net interest margin by using representative bank approach. They found that those banks that are management efficient are able to obtain lower cost of deposit and higher cost of interest loan. Gounder & Sharma (2012) worked on the determinants of bank's net interest margin of Fiji and found that quality of management is positively related with net interest margin. There is a need of implicating measures aimed at increasing competition and efficiency in the banking system of Fiji.

Nigeria's banks have shown great bank performance from last few decade so they check that what are the factors that are effecting on profitability of banks. The results showed that size, management efficiency, economic condition contributes toward profitability of banks of Nigeria (Obamuyi, 2013)

Angbazo (1997) and Maudos & fernandez de Guevara (2004) explained about the management efficiency. Management efficiency is picking low risk and high return assets (high quality assets and low cost liabilities). Cost over income ratio is the measure of management efficiency. If the ratio increase it means deterioration in management efficiency and hence net interest margin decreases. So, impact of management efficiency is negative with net interest margin.

Hence above literature proposed following hypothesis which explain the relation between management efficiency and net interest margin.

*H<sub>4</sub>: There is a negative relationship between management efficiency and NIM.*

## **2.6 Implicit Interest Payment and net interest margin**

Kasman et al., (2010) explained that implicit interest payment is another determinant of net interest margin which significantly and positively related with net interest margin because of this reason bank gave free banking services which in turn lead to higher net interest margin. Implicit interest payment showed the extra amount to the depositors that are collected through services charges remission or any other type of transfer fees. If implicit interest payment increases net interest margin increase so its predicted coefficient sign is positive.

The determinants of net interest margin may be different from country to country because there is variation in social and economical conditions. This is the study of Ethiopian banking sector to sort out the net interest margin of this region. Expert's opinion was taken from different bank experts that are working in private, public and commercial banks. The finding of this region shows that implicit interest payment is positively and significantly related to net interest margin. It indicates the effort of banks to recover the money that has been paid as implicit interest payment.

Hawtrey and Liang (2008) explained that implicit interest payments are positively related to bank interest margin. They worked on the empirical determinants of banks net interest margin by using representative bank approach and they found that implicit interest payment is positively related to bank interest margin. Zhou and Wong (2008) showed that the interest margin of China's commercial banks decline over time and the implicit interest payment affect the interest margin. If we compare china with EU community china is less competitive.

Gounder & Sharma (2012) worked on the determinants of bank's net interest margin of Fiji, from the period 2000 to 2010 by following the model of Ho and Saunders (1981) which is

called dealership model, by using panel data techniques they found that implicit interest payment are positively related with net interest margin.

Hence above literature proposed following hypothesis which explain the relation between implicit interest payment and net interest margin.

*H<sub>5</sub>: There is a positive relationship between implicit interest payment and net interest margin.*

## **2.7. Default Risk and net interest margin**

Jude (2003) Tarsila, Priscilla, Marcio (2001) found that increase in Default risk leads to high interest margin. Net interest margin continuously declining after 1997 thus profit is squeezing due to extensive loan default. There are some clear differences in the risk of default; risk of default is showing positive relation with NIM net interest margin (Ho and Saunders, 1981).

Bank loans have a positive impact on net interest margin if there are more loans the bank will earn more profit from the income generating from the loans. On the other hand if bank take loan from other companies and unable to pay that loan the risk of default increases. Non interest bearing reserve in this context have a negative impact on net interest margin because that reserve is just for the security of bank and from that reserve bank is not generating any profit. Results of this study suggest that if the banks reduce the non interest bearing reserves and invest that money in some other project the net interest margin of the banks could be increase (Naceur, 2003).

Hence above literature proposed following hypothesis which explain the relation between default risk and net interest margin.

*H<sub>6</sub>: There is a positive relationship between default risk and net interest margin*



## **2.8 Leverage risk and net interest margin**

Leverage is defined as the ratio of total liabilities and net worth of the bank. Leverage is the amount of borrowed money used for investment for any business to generate profit. When a bank have more leverage it means that the bank have more debt than equity. Too much debt is not good for banks because it can increase the default risk. When the ratio of leverage increases an increase in solvency risk take place which is conducive to high net interest margin (Afanasieff & et al., 2002)

There are a variety of determinants that impact on bank profitability and change in net interest margin, leverage is one of it and the impact of leverage risk on net interest margin is negative. Foreign banks are having more profit margin then domestic banks (Demirguc and Huizinga, 1999). By using a sample of 553 banks of 24 countries Abedifar, Molyneux and Tarazi (2013) found that small Islamic banks that are leveraged have less credit risk then other banks.

Tarsila, Priscilla, Marcio (2001) found that increase in leverage leads to high interest margin. On the other hand opportunity cost of leverage increase when non interest bearing reserves is high. Banks may face two different kinds of problems by making risking loans or by investing in insufficient projects. Optimal level of bank leverage should neither too high or neither too low (Acharya et al., 2016).

Hence above literature proposed following hypothesis which explain the relation between leverage risk and net interest margin.

*H<sub>7</sub>: There is a negative relationship between leverage risk and net interest margin.*

## 2.9 Non interest bearing reserve and net interest margin

This study has been done by the commercial banks of China by Zhou and Wong (2008) and they showed that the net interest margin of china's commercial banks has declined over time and bank reserve affect the net interest margin. If compare china with European Union community China is less competitive. If the banks of China will not improve the management efficiency and its non interest bearing reserve, the banking stability of China will be at risk.

Tarus, Chekol and Mutwol (2012) found that higher reserve is positively and significantly related to net interest margin. Because when bank have reserves the management would be able to show a security to its shareholders and investors. If the bank doesn't have reserve it reflects a negative image because bank could not be able to pay back to the investors and there is a risk of default for banks.

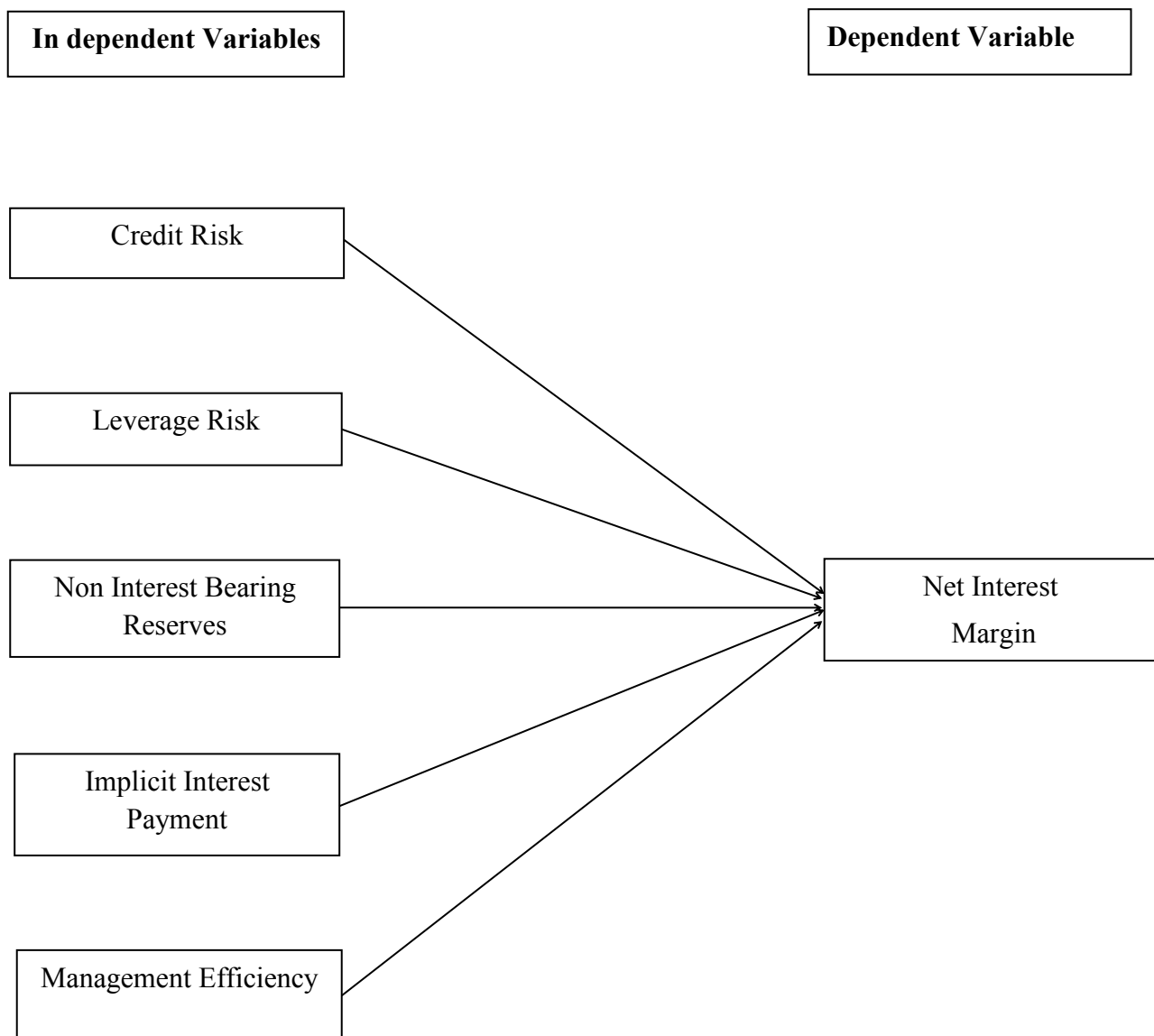
Bektas (2014) findings showed that higher reserve are positively and significantly related to NIM net interest margin because non interest bearing reserve secure the market position of a bank in a country. Afanasieff, Lhacer and Nakane (2002) found that there is a positive effect of non interest bearing reserve, one reason is that the opportunity cost of non interest bearing reserve increase when non interest bearing reserve is high. Banks assume vital part in current economies by exchanging reserves from loan specialists to borrowers. Indeed, even in economies with very much created and working money related markets, the bury intervention part of banks is fundamental.

Hence above literature proposed following hypothesis which explain the relation between non interest bearing reserve and net interest margin.

*H<sub>8</sub>: There is a positive relationship between non interest bearing reserve and net interest margin.*

Table 2.1 shows the relationship of independent variable with dependent variables. According to the above literature credit risk has a negative impact on net interest margin. Implicit interest payment has a positive and significant impact on net interest margin while management efficiency has a negative impact on net interest margin. Non interest bearing reserve has a positive impact on net interest margin while leverage risk has a negative and significant impact on net interest margin.

## 2.1 Theoretical Model



## **Chapter 03**

### **Data Analysis and Methodology**

This section of study represents the sources from which data has been collected. It explains research methodology that is used to conduct the study. The data has been collected from the banks of Pakistan, India and Bangladesh and the reason of research from these three countries is that Pakistan, India and Bangladesh are having same financial nature. For the determination of empirical analysis, this study uses a descriptive analysis, correlation, Generalized Method of Moments (GMM) and regression models. A descriptive analysis of data is performed to get sample characteristics.

#### **3.1 Econometric methodology**

The model that is applied in this research is Generalized Method of Moments which is abbreviated as GMM. Panel data has been used to test the relationship between the variables. When a data contain observations of multiple phenomena over multiple period of time for same individuals or firms is called panel data. Balanced panel data has been used in this study where every observation is for the same period of time.

##### **3.1.1 Generalized Method of Moments (GMM)**

Generalized method of moments (GMM) used in econometric and statistics to estimate statistical models and parameters. Generalized method of moments is applied in context of semi parametric model, in semi parametric model parameter of interest is finite whereas it may possible that the full shape of distribution function of data may not known due to this maximum likelihood estimation is not applicable. For this method a certain number of moments conditions

require. GMM minimize a lot of norms of sample average of the moment conditions. Lars Peter Hansen in 1982 developed the model of GMM and later on it was introduced by Karl Pearson in 1894.

Estimation of Generalized Method of Moment was formalized by Hansen in 1982 and after that this model applied in the fields of economics and finance. For the implementation of GMM moment conditions are required. The main idea behind GMM is to replace the theoretical expected value with the empirical analog. The method of GMM has a lot of practical and theoretical application that covers sufficient number of observations. Generalized Method of Moment is a very popular process for the estimation of population moment sample. This is the reason that of applying Generalized Method of Moments (GMM).

The techniques of one step and two step estimation are used to resolve the issue of endogeneity which arises due to the involvement of lag of dependent variable and individual effects. Major problem with OLS appeared in the literature is that estimated coefficients are not consistent and efficient, if the independent variables are supposed to be endogenous. So, this problem can be avoid by using the model of Generalized Method of Moments (GMM) one step or two step estimation technique.

The analysis that has been taken in this study is panel data analysis. Panel data can be explained as the data set that have both cross-sectional and time dimension. When the cross-section observations are pooled against one time then the resultant is cross-sectional data but if it is pooled over the time period the resultant is called panel data. Panel data have a lot of advantages over the other sets of data. It can increase the observations for analysis that is the main focus to obtain the effective and efficient estimates. If the set of data has complete

observation of a specific unit of the time period then this type of data is known as balanced panel data but if some observations are missing then it is know as unbalanced panel data.

The equation for panel data model for liner regression is given below. The liner regression model can be explain a follows

$$Y_{it} = \beta_0 + \sum_{j=1}^n \beta_j X_{jit} + \mathcal{E}_{it} \quad (1)$$

General equation of Generalized Method of Moments is as follows!

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \mathcal{E}_{it} \quad (2)$$

The equation would be written as above because dependent variables depend on the lag values of the dependent variable due to the problem of endogeneity. The banks that are used in this study are heterogeneous because every bank nature and financial terms are different from other banks and the banks of other country. The banks of Pakistan are different from the banks of Bangladesh and India similarly with the banks of India and Bangladesh so fixed effect model has been used due to heterogeneity between the banks.

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \sum_{j=1}^n \beta_j X_{jit} + \mathcal{E}_{it} \quad (3)$$

$Y_{it}$  is a dependent variable while  $X_{jit}$  is a vector of independent variables.  $X$  is an explanatory variable that explain default risk, liquidity risk, leverage, implicit interest payment, size, non interest bearing reserve, management efficiency, and credit risk. Whereas  $t$  represents the time and  $\mathcal{E}$  represents the error term. Equation number (1) represents population and  $\beta_0$  represents intercept that is equal to all cross sections and it is constant. Vector of explanatory variables are explained by  $j$ .

## **3.2 Data description**

The current study aims to explore the effect of leverage risk, implicit interest payment, non interest bearing reserve, management efficiency, and credit risk on net interest margin of the banks of Pakistan, India and Bangladesh. Banks were selected through non probability sampling technique because it is less expensive and more convenient to collect. Data has been collected from the year 2005 to 2015.

### **3.2.1 Sample size**

Data has been collected from annual reports of Pakistan, India and Bangladesh from. This data is secondary and the major part of data has been taken from the annual reports of Pakistan, India and Bangladesh. The sample consists of 41 commercial banks of Pakistan, 38 commercial banks of India and 26 commercial banks of Bangladesh because only the data of 41, 38 and 26 commercial banks of Pakistan, India and Bangladesh was continuously available. But after collecting data it has been seen that only the data of 33 banks of Pakistan, 36 banks of India and 18 banks of Bangladesh was complete and accurate so the sample size of 87 has been used. Balanced panel data has been collected on 33, 36 and 18 banks of Pakistan, India and Bangladesh respectively.

Secondary data are collected from bank's annual reports. Frequency of banks by country wise and there cumulative frequency is given in following Table 3.1.

**Table 3.1: Sample Classification**

<b>Countries</b>	<b>No. Of Banks</b>	<b>Percentage</b>
Pakistan	33	$33/87=0.37*100=37\%$
India	37	$37/87=0.413*100=42.5$
Bangladesh	18	$18/87=0.206*100=20.68$
<b>Total</b>	<b>87</b>	<b>100</b>

Table 3.1 shows that the frequency of the banks of Pakistan is 33, the bank of India is 37 and the bank of Bangladesh is 18 of the above mention distribution; it shows the cumulative frequency of 100. Frequency in this table shows that how many of the banks are there in a set while the cumulative frequency explain the sum of all above mention frequencies. Cumulative frequency is used to check the number of observation that lie below or above a particular value of the data set.

### **3.3 Variables of study and measurement:**

Net interest margin is the dependent variable and the whole research surrounds around it. Net interest margin is the profit that banks earn. Now the work is to check that what is the role of determinant of net interest margin in increasing or decreasing that interest margin of banks of emerging markets. The independent variables that have discussed in literature review are default risk, liquidity risk, leverage risk, implicit interest payment, size, non interest bearing reserve, management efficiency, and credit risk but in methodology and results only leverage risk,



implicit interest payment, non interest bearing reserve, management efficiency and credit are reported because only the result of these variables are significant while the other variables are insignificant so those variables are not reported.

Following is the summary of bank dependent and independent variables, there abbreviation and the sources that from where these variables has been taken.

**Table 3.2 List of Variables**

<b>Variables</b>	<b>Name</b>	<b>Abbreviation</b>	<b>Sources</b>
<b>Dependent Variable</b>	Net Interest Margin	NIM	Maudos & Guevra (2004). Angbazo (1997) Ongore & Kusa (2013) Saksonova (2014). Meshesha (2016) English (2002)
<b>Independent Variables</b>	Non Interest bearing Reserves	NIBR	Zhou and Wong (2008) Tarus, Chekol and Mutwol (2012) Bektas (2014) AfanasiEFF, Lhacer and Nakane (2002)
	Leverage Risk	LR	AfanasiEFF & et al. (2002) Tarsila, Priscilla, Marcio (2001) Acharya et al. (2016)
	Credit Risk	CR	Maudos & Guevra (2004) Guru and Staunton (2002) Simkovic (2016) Lin and et al., (2012) HawtreY and Liang (2008)
	Management Efficiency	MGT	Kasman et al.(2010) Guru and Staunton (2002) Brissimis,Delis&Papanikolaou (2008) Zhou and Wong (2008)
	Implicit Interest Payment	IIP	Kasman & et al., (2010) HawtreY and Liang (2008) Zhou and Wong (2008)

### 3.3.1 Dependent variable

Net Interest Margin is taken as dependent variable. The difference between interest income generated by the banks and the amount of interest paid to the lenders is refer as net interest margin. Net interest margin is also refer as the percentage of profit that a bank earn from loans or from other assets minus the interest paid divided by the average of assets. Net interest margin is one of the most appropriate way to find out the stability and effectiveness of banks. The data collection of net interest margin has been done from bank's annual reports. Net interest margin has been calculated by the proxy that has taken from the paper of (Kasman et al., 2010)

$$\text{Net Interest Margin} = \frac{\text{Interest Income Earned} - \text{Interest Expense}}{\text{Total Loan to Customers}} * 100$$

Following are the variables of empirical model of net interest margin of banks and their predicted coefficients and their proxies.

$NIM = f(\text{Leverage risk, Credit risk, Implicit Interest Payments, Non interest bearing reserves, Management efficiency})$

### 3.3.2 Independent variables

The bank specific independent variables are credit risk, leverage, implicit interest payment, non interest bearing reserve and management efficiency. The capital base (LEV) is measured by the ratio [CORE CAPITAL/TOTAL ASSETS] to proxy for the risk of insolvency. Implicit interest payments (IMPLICIT) are measured by [NONINTEREST EXPENSE - NON-INTEREST REVENUE]/[ AVE. EARNING ASSETS] to reflect extra payments to depositors through service charge remission or other types of transfers due to competition in the market for deposits.

Leverage is an investment strategy of using the borrowed money of various financial instruments and the capital to increase the return on the investment. The amount of debt used to finance any asset is also called leverage. Return of equity of a bank increases at an ideal level of financial leverage because by the use of leverage stock volatility increases, that increases the level of risk but in turn an increase in return take place. But if a bank over-leveraged a decrease in return could take place. Leverage (LEV) is the proxy for solvency risk and it is positively related to net interest margin of bank while tier 1 capital is the most perfect measure of a bank capital and to measure the financial health of a bank. The proxy of leverage risk has been taken from the paper of (Angbazo,1997). To measure the proxy of leverage risk the ratio of tier 1 capital to total assets is used.

$$\text{Leverage risk} = \text{LEV: Tier 1 Capital/Total Asset}$$

Credit risk is the potential that a borrower bank fail to fulfill its agreed obligations and terms. On a certain level of debt credit risk become the risk of default on debt that arises when a borrower fails to make required payment. In simple the risk o lender is that when they lost cash flows, principle and interest and it then increase collection cost. This loss could be complete or partial. Higher level of risk of credit leads to higher cost of borrowing. The proxy of credit risk has been taken from the paper of Maudos & Guevra (2004). Credit risk is positively and significantly related to bank net interest margin. Bektas (2014).

$$\text{Credit Risk} = \text{Loans/ Total Assets}$$

Implicit interest payment shows the extra amount to the depositors that are collected through services charges remission or any other type of transfer fees. In simple words if a person borrow one thousand rupees and agree to make ten payments of 100 on the debt then the loan

agreement has an implicit interest rate of 20%. Implicit interest payment is the one that is not explicit. If implicit interest payment increases net interest margin increase so its predicted coefficient sign is positive. This proxy of implicit interest payment has been taken from the paper of Kasman & et al., (2010)

$$\text{Implicit Interest Payment} = \frac{\text{IMPLICIT: Operating Expense- Non Interest Revenue}}{\text{Total Assets}}$$

A lot of central banks have authorized to vary or fix the minimum cash reserves that a bank must hold against their liabilities. In most of the countries the requirement of reserve against deposit is provide to include certain assets in addition to cash. Those reserve that a bank keep or submit it to state bank just for a security and don't receive any interest on it is called non interest bearing reserve. The proxy of NIBR has been taken from the paper of Angbazo (1997). Non interest bearing reserve has positive effect on net interest margin.

$$\text{Opportunity cost of non-interest bearing reserve} = \frac{\text{NIBR: non-interest bearing reserve}}{\text{Total Asset}}$$

Management efficiency is one of the most important factor in national and international banks because good or bad management effect the activities of bank. A bank is called management efficient if its assets are efficient and give more profit and liquidate easily. The management efficiency has positive effect on net interest margin; it shows that when management efficiency increases revenues increases as a result net interest margin of bank will also increases. The proxy of default risk has been taken from the paper of Kasman et al. (2010).

$$\text{Management Efficiency} = \text{MGMT: Ratio of operating expense to total income.}$$

Table 3.3 shows the descriptive statistical analysis for all variables of this study for the period of 2005 to 2015. The mean value represents the average value of variables and standard deviation measure of the dispersion from the mean. And the maximum value identifies the highest value and minimum shows the lower value of data. The net interest margin has a mean of 3.35423 having the maximum and minimum value of 17.99 and 0.84 and the range of 17.15 while the standard deviation is 2.37.

### 3.4 Model specification

Panel regression model is used to explore the impact of risk factors (credit risk, implicit interest payment, leverage risk, management efficiency and non interest bearing reserves ) on net interest margin which banks face in providing immediacy. In this case the model of net interest margin can be written as follows

$$NIM_{it} = \beta_0 + \beta_1 NIM_{it-1} + \beta_2 CR_{it} + \beta_3 IIP_{it} + \beta_4 LEV_{it} + \beta_5 MGT_{it} + \beta_6 NIBR_{it} + \mathcal{E}_{it} \quad (4)$$

**Table 3.3 Descriptive statistics**

	<b>Mean</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Range</b>	<b>Std. Dev.</b>
<b>NIM</b>	3.35423	17.99	-0.84	17.15	2.373075
<b>CR</b>	0.869723	0.98	0.03	0.95	0.154663
<b>IIP</b>	0.011431	0.25	-0.23	0.02	0.031797
<b>LEV</b>	8.207862	54.54	0	54.54	8.0454
<b>MGT</b>	0.2676	2.03	0	2.03	0.209959
<b>NIBR</b>	0.106185	0.58	-0.03	0.55	0.102567

The mean of credit risk is 0.869, minimum level of credit risk is 0.03 and maximum level is 0.89 and the range is 0.95 while the standard deviation is 0.154. The mean of implicit interest payment is 0.0114 and maximum value is 0.25, minimum value is -0.23 while the range and standard deviation is 0.02 and 0.0317.

Leverage risk has a mean of 8.207 having a range of 54.54 and a standard deviation of 8.045 while the maximum and minimum value is 54.54 and 8.045 respectively. Management efficiency has a mean of 0.267 and range of 2.03 and 0.2099 while the maximum value of management efficiency is 2.03 and minimum value is 0. Non interest bearing reserves has a mean of 0.106185 while the maximum and minimum value is 0.58 and -0.03 respectively. The standard deviation of non-interest bearing reserve is 0.10.

Table 3.4 contains a correlation matrix of dependent and independent variables used in this study. This table contains the correlation between the net interest margin (NIM), credit risk (CR) implicit interest payment (IIP), leverage risk (LEV), management efficiency (MGT) and non interest bearing reserve (NIBR) . This relationship is between two or more variable.

**Table 3.4 Correlation**

	<b>NIM</b>	<b>CR</b>	<b>IIP</b>	<b>LEV</b>	<b>MGT</b>	<b>NIBR</b>
<b>NIM</b>	1					
<b>CR</b>	-0.380205	1				
<b>IIP</b>	0.594827	-0.27946	1			
<b>LEV</b>	-0.218712	0.436501	-0.234848	1		
<b>MGT</b>	0.408684	-0.482744	0.770877	-0.359363	1	
<b>NIBR</b>	-0.143853	0.26616	-0.157352	0.636579	-0.170178	1

Correlation between the variables are find out by person correlation. All correlations that are higher than 0.12 and or lower than -0.12 (corresponding to a significance of at least 5%) . If the value in correlation is negative it means that the variables are negatively correlated with each other. If the sign between two variables are positive it means that the variables are positively correlated. If the value is zero it means that their is no relationship between the variables.



The relationship between credit risk (CR) and net interest margin is negative and significant. The relationship between implicit interest payment (IIP) and net interest margin is positive but insignificant. The relationship between leverage risk (LEV) and net interest margin is negative and insignificant. Management efficiency (MGT) shows a positive and insignificant relationship with net interest margin. Non interest bearing reserves (NIBR) shows negative and insignificant relationship with net interest margin.

The relationship between credit risk (CR) and net interest margin (NIM) is negative and insignificant while the relationship of credit risk (CR) and leverage risk (LR) is positive and insignificant. The relationship of credit risk (CR) and management efficiency (MGT) is negative and insignificant. On the other hand relationship of credit risk (CR) with non interest bearing reserve (NIBR) is positive and insignificant.

The relationship between implicit interest payment (IIP) and leverage risk (LEV) is negative and insignificant while the relationship between implicit interest payment (IIP) and management efficiency (MGT) is positive and insignificant. The relationship between implicit interest payment and (IIP) non interest bearing reserve (NIBR) is negative and insignificant.

Leverage risk (LEV) and management efficiency (MGT) are showing negative and insignificant relationship with each other. While the leverage risk (LEV) and non interest bearing reserve (NIBR) are showing positive and insignificant relationship with each other. Management efficiency (MGT) and non interest bearing reserve (NIBR) are having negative and insignificant relationship with each other.

## Chapter 04

### Empirical Results and Discussion

In the chapter of empirical results and discussion the implementation of Generalized Method of Moment (GMM) is generated which provide the relationship of dependent variable that is net interest margin (NIM) with credit risk (CR), implicit interest payment(IIP), leverage risk(LEV), management efficiency (MGT) and non interest bearing reserves(NIBR). The independent variables that have discussed in literature review are default risk (DR), liquidity risk (LR), leverage risk( LEV), implicit interest payment (IIP), size (SIZ), non interest bearing reserve (NIBR), management efficiency (MGT), and credit risk (CR) but in methodology and results only leverage risk (LEV), implicit interest payment (IIP), non interest bearing reserve (NIBR), management efficiency (MGT) and credit risk (CR) are reported because only the result of these variables are significant while the other variables are insignificant so those variables are not reported.

Table 4.1 shows that the results for net interest margin that is dependent variable and bank specific determinants by using multivariate regression analysis. Generalized method of moments GMM has been used to estimate the results.

NIM (-1) is a lag variable depend upon its own previous values and it is significant. It is a trended variable that has been taken from historical data.

**Table 4.1 Determinants of net interest margin**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>C</b>	5.070357	0.520306	9.74495	0.00
<b>NIM(-1)</b>	0.364109	0.053764	6.772324	0.00
<b>CR</b>	-2.95605	0.437918	-6.75024	0.00
<b>IIP</b>	36.1971	3.26065	11.10119	0.00
<b>LEV</b>	-0.01827	0.007824	-2.33514	0.01
<b>MGT</b>	-2.89705	0.36938	-7.84301	0.00
<b>NIBR</b>	1.060529	0.556987	1.904045	0.05
R-squared	0.649			
Adjusted R-squared	0.646			
J-statistic	51.08			
Prob(J-statistic)	0.00			

The sign of coefficient represents that either the variable is positively impacting of dependent variable or negatively impacting on dependent variable. If the value of t-statistic is greater than 2 it mean that the variable is significantly impacting of dependent variable. If the value of t-statistics is smaller then 2 it shows that the variable is not significant. Probability value should be smaller then .05 . If the value is smaller than .05 it shows that the variable is significant and if the value is greater then .05 it shows that the variable is insignificant.

(CR) represents the credit risk. The coefficient value of credit risk is -2.956 and t-statistic value is -6.7 while the P-value is 0.00. Credit risk (CR) is negatively and significantly impact on net interest margin. According to Tarus, Chekol and Mutwol (2012) if the credit risk will be higher the higher will be the net interest margin hence the effect of credit risk is positive on net interest margin. Anbar and Alper (2011) said that banks could enhance their ratio of profit by decreasing the ratio of credit because ratio of credit and size of loans have a negative impact on the profitability of bank.

Kasman and et al., (2010) explain that bank interest margin is positively related with credit risk. It also shows that bank demand higher rate of interest to overcome unexpected risk of credit. Fungacova& Poghosyan (2011) studied the determinants of net interest margin of Russia and conclude that credit risk is showing negative relation with net interest margin. According to the previous literature the impact of credit risk could be positive or negative on net interest margin but the result of this study shows that credit risk (CR) is negatively impacting on net interest margin. The results are supporting hypothesis and previous literature.

Implicit interest payment (IIP) positively 36.19 effect and significantly 0.00 effect on net interest margin. It means if the implicit interest payment increase in cross countries then the net interest margin also increase. Kasman et al. (2010) explained that implicit interest payment is another determinant of net interest margin which significantly and positively related with net interest margin because of this reason bank gave free banking services which in turn lead to higher net interest margin. Implicit interest payment showed the extra amount to the depositors that are collected through services charges remission or any other type of transfer fees. If implicit interest payment increases net interest margin increase so its predicted coefficient sign is positive.

Hawtrey and Liang (2008) explained that implicit interest payments are positively related to bank interest margin. The results are supporting hypothesis and previous literature.

Leverage risk (LEV) is negatively -0.018 and significantly 0.01 impacting on the net interest margin. Tarsila, Priscilla, Marcio (2001) found that increase in leverage leads to high interest margin. When the ratio of leverage increases an increase in solvency risk take place which is conducive to high net interest margin (Afanasieff & et al. (2002). The impact of leverage risk on net interest margin is negative. Foreign banks are having more profit margin then domestic banks (Demirguc and Huizinga, 1999). The results are supporting hypothesis and previous literature.

Management efficiency (MGT) negatively and significantly impacting on the net interest margin. The coefficient value of management efficiency is -2.89 while the P-value is 0.00 t-statistics value is -7.84. Here the impact of management efficiency is negative on net interest margin. The results are supporting hypothesis and previous literature.

Non-interest bearing reserve (NIBR) positively and significant impact on net interest margin. The coefficient value of non interest bearing reserve is 1.060 while the P-value is 0.05. The higher reserve is positively and significantly related to (NIM) net interest margin. Because when bank have reserves the management would be able to show a security to its shareholders and investors. If the bank doesn't have reserve it reflects a negative image because bank could not be able to pay back to the investors and there is a risk of default for banks. Tarus, Chekol and Mutwol (2012).The results are supporting hypothesis and previous literature.

R-squared value shows that how much independent variables explain the dependent variables. The value of R-square is 64% and it shows that independent variables (credit risk,

implicit interest payment, leverage risk, management efficiency, non interest bearing reserves) are 64% explaining the net interest margin. There is no hard and fast rule for R-squared requirement. Usually the R-squared value in the literature is considered good of finance if it is in between 60% to 70% . But there is a problem with R-squared as the number of independent variables increases the value of R-square will also increase and the increasing R-square is not always favorable. Most probably this increase in R-square is due to multicollinearity. The explanatory power that increases due to the increase in variable can be resolved by using adjusted R-square. The value of adjusted R-square is also 64% . As there is no gap between R-square and adjusted R-square, it shows that the data has no issue and it is accurate. Parsimonious model is that model in which minimum independent variables are maximum explaining the dependent variable and this model is almost parsimonious model.

J-statistics used to check the validity of instruments of independent variables that have been taken in the analysis. J-statistics is used to test the validity of over identifying restriction if the instruments are more than parameters. If the probability value of J-statistics is smaller than .05 it shows that the instruments are valid and accurately taken.

## Chapter 05

### Conclusion and Recommendations

#### 5.1 Conclusion

This research study investigates about the financial sector of Pakistan, Bangladesh & India to find out the determinants of bank's net interest margin in these countries. Financial sector are those that provide financial services to commercial and retail customers. Financial sector include banks, insurance companies, investment funds and real estate. Banking institution is one of the most largest financial sector in the world. It is necessary to study the banking sector of developing countries.

The measure of an investing strategy's success is net interest margin (NIM). Net interest margin (NIM) can be explain as the performance that examine the success of a bank's investment decisions in contrast to its debt situation. A positive net interest margin means that bank investment decision paying more then its cost on the other hand if net interest margin is negative then investment strategy of a bank cost more then it earn. Negative of net interest margin shows that bank is unable to take rite decision.

Net interest margin is most important component for the profitability of banks. Net interest margin is basically the interest income that bank generates. If the net interest margin of bank is high the more profit bank would earn and bank would be considered as more stable. There are numerous purposes behind this study as policymakers think about banks interest margin at the time of policy making and financial decisions.

This study endeavors to explore the determinants of bank's net interest margins; credit risk(CR), leverage risk (LEV), implicit interest payment (IIP), non interest bearing reserves (NIBR) and management efficiency (MGT) in Pakistan, India and Bangladesh. The purpose of choosing these three countries is that minimum work has been done on these countries and these countries are having same financial nature. This work would be helpful for managers and policy makers in future. The investors could also keep these points in mind at the time of investment.

The model that is applied in this research is Generalized Method of Moments which is abbreviated as GMM. Panel data has been used to test the relationship between the variables. Data of 37 banks of India, 18 banks of Bangladesh and 33 banks of Pakistan has been taken to test the hypothesis.

The results shows that credit risk has a negative and significant impact on net interest margin. Implicit interest payment has a positive and significant impact on net interest margin while management efficiency has a negative and significant impact on net interest margin. Non interest bearing reserve has a positive and insignificant impact on net interest margin while leverage risk has a negative and significant impact on net interest margin.

## **5.2 Future Recommendations**

Some of the variables (credit risk, leverage risk, implicit interest payment, non interest bearing reserve and management efficiency) that are impacting the net interest margin of the banking sectors of Pakistan, India and Bangladesh has been identify but a lot of other factors that are impacting on interest margin of there countries can also be identify by taking this study under consideration. So, this study can provide a road map or guideline for future researchers. On the



other hand at the time of decision making in financial sector managers would keep these points in their mind for better decision making.

In this study, due to time and data limitations Islamic banks and micro finance banks are not taken into consideration. Future researchers can extend this study by including Islamic banking and micro finance banks. The current study might be helpful for regulatory authority of Pakistani banking system, investors, and policy makers of banks. As well as, it will provide the base contextually for further studies and a contribution to empirical literature.

## References

- Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking & Finance*, 21(1), 55-87.
- Abduh, M., & Idrees, Y. (2013). Determinants of Islamic banking profitability in Malaysia. *Australian Journal of Basic and Applied Sciences*, 7(2), 204-210.
- Anbar, A., & Alper, D. (2011). Bank specific and macroeconomic determinants of commercial bank profitability: Empirical evidence from Turkey.
- Abreu, M., & Mendes, V. (2001, May). Commercial bank interest margins and profitability: evidence for some EU countries. In *Pan-European Conference Jointly by the IEFSUK & University of Macedonia Economic & Social Sciences, Thessaloniki, Greece, May* (pp. 17- 20).
- Abedifar, P., Molyneux, P., Tarazi, A. (2013). Risk in Islamic banking. *Review of Finance*, 17(6), 2035-2096.
- Acharya, V. V., Mehran, H., & Thakor, A. V. (2016). Caught between Scylla and Charybdis? Regulating bank leverage when there is rent seeking and risk shifting. *The Review of Corporate Finance Studies*, 5(1), 36-75.
- Afanasiëff, T. S., Lhacer, P. M., & Nakane, M. I. (2002). The determinants of bank interest spread in Brazil. *Money Affairs*, 15(2), 183-207.
- Ben Naceur, S., & Goaid, M. (2008). The determinants of commercial bank interest margin and profitability: evidence from Tunisia. *Frontiers in Finance and Economics*, 5(1), 106-130.
- Bektas, E. (2014). Are the determinants of bank net interest margin and spread different? The case of North Cyprus.

- Brissimis, S. N., Delis, M. D., & Papanikolaou, N. I. (2008). Exploring the nexus between banking sector reform and performance: Evidence from newly acceded EU countries. *Journal of Banking & Finance*, 32(12), 2674-2683.
- Bonin, J. P., Hasan, I., & Wachtel, P. (2005). Bank performance, efficiency and ownership in transition countries. *Journal of banking & finance*, 29(1), 31-53.
- Doliente, J. S. (2005). Determinants of bank net interest margins in Southeast Asia. *Applied Financial Economics Letters*, 1(1), 53-57.
- Demirguc-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margin and profitability: some international evidence. *The World Bank Economic Review*, 13(2), 379-408.
- English, W. B. (2002). Interest rate risk and bank net interest margins. *BIS Quarterly Review*, 10, 67-82.
- Fernandez, J., Joaquin, M., & Juan, F. D. G. (2003). Factors Explaining the Interest Margin in the Banking Sectors of the European Union. *MPRA Paper*.
- Fungáčová, Z., & Poghosyan, T. (2011). Determinants of bank interest margins in Russia: Does bank ownership matter?. *Economic systems*, 35(4), 481-495.
- (Gul, S., Irshad, F., & Zaman, K. (2011). Factors affecting bank profitability in Pakistan. *The Romanian Economic Journal*, 39(14), 61-89.)
- Guru, B. K., Staunton, J., & Balashanmugam, B. (2002). Determinants of commercial bank profitability in Malaysia. *Journal of Money, Credit, and Banking*, 17, 69-82.

- García-Herrero, A., Gavilá, S., & Santabárbara, D. (2009). What explains the low profitability of Chinese banks?. *Journal of Banking & Finance*, 33(11), 2080-2092.
- Gounder, N., & Sharma, P. (2012). Determinants of bank net interest margins in Fiji, a small island developing state. *Applied Financial Economics*, 22(19), 1647-1654.
- Hawtrey, K., & Liang, H. (2008). Bank interest margins in OECD countries. *The North American Journal of Economics and Finance*, 19(3), 249-260.
- Hamadi, H., & Awdeh, A. (2012). the Determinants of bank Net Interest Margin: evidence from the lebanese banking sector. *journal of Money, Investment and banking*, 23(23), 85-98.
- Ho, T. S. Y., and A. Saunders. (1981) "The Determinants of Bank Interest Margins: Theory and Empirical Evidence." *Journal of financial and Quantitative Analysis*, 581-60
- Jude, B. A., & Taylor, R. K. (2005). A colonization factor links *Vibrio cholerae* environmental survival and human infection. *Nature*, 438(7069), 863-866.
- Kasman, A., Tunc, G., Vardar, G., & Okan, B. (2010). Consolidation and commercial bank net interest margins: Evidence from the old and new European Union members and candidate countries. *Economic Modelling*, 27(3), 648-655.
- Kasman, I. M., ... & Modrusan, Z. Chen, R., Nishimura, M. C., Bumbaca, S. M., Kharbanda, S., Forrest, W. F., (2010). A hierarchy of self-renewing tumor-initiating cell types in glioblastoma. *Cancer cell*, 17(4), 362-375.
- (Kosmidou, K., Tanna, S., & Pasiouras, F. (2005, June). Determinants of profitability of domestic UK commercial banks: panel evidence from the period 1995-2002. In *Money Macro and Finance (MMF) Research Group Conference* (Vol. 45, pp. 1-27).)

- Lin, J. R., Chung, H., Hsieh, M. H., & Wu, S. (2012). The determinants of interest margins and their effect on bank diversification: Evidence from Asian banks. *Journal of Financial Stability*, 8(2), 96-106.
- Maudos, J., & De Guevara, J. F. (2004). Factors explaining the interest margin in the banking sectors of the European Union. *Journal of Banking & Finance*, 28(9), 2259-2281.
- Maudos, J., & Solís, L. (2009). The determinants of net interest income in the Mexican banking system: An integrated model. *Journal of Banking & Finance*, 33(10), 1920-1931.
- Meshesha, D. (2016). *Determinants of Net Interest Margin in the Ethiopian Banking Industry* (Doctoral dissertation, AAU)
- Naceur, S. B. (2003). The determinants of the Tunisian banking industry profitability: Panel evidence. *Universite Libre de Tunis working papers*.
- Obamuyi, T. M. (2013). DETERMINANTS OF BANK'S PROFITABILITY IN A DEVELOPING ECONOMY: EVIDENCE FROM NIGERIA. *Organizations and markets in emerging economies*, (2), 97-111.
- Ongore, V. O., & Kusa, G. B. (2013). Determinants of financial performance of commercial banks in Kenya. *International Journal of Economics and Financial Issues*, 3(1), 237.
- Olweny, T., & Shipho, T. M. (2011). Effects of banking sectoral factors on the profitability of commercial banks in Kenya. *Economics and Finance Review*, 1(5), 1-30.
- Saksonova, S. (2014). The Role of Net Interest Margin in Improving Banks' Asset Structure and Assessing the Stability and Efficiency of their Operations. *Procedia-Social and Behavioral Sciences*, 150, 132-141.
- Simkovic, M. (2016, May). What Can We Learn from Credit Markets?. *In proceeding of the 93<sup>rd</sup> Annual Meeting of the Annual Meeting of the American Law Institute*.

- Tarus, D. K., Chekol, Y. B., & Mutwol, M. (2012). Determinants of net interest margins of Commercial Banks in Kenya: a panel study. *Procedia Economics and Finance*, 2, 199-208.
- Williams, B. (2007). Factors determining net interest margins in Australia: domestic and foreignbanks. *Financial Markets, Institutions & Instruments*,16(3), 145-165.
- Zhou, K., & Wong, M. C. (2008). The determinants of net interest margins of commercial banksin mainland China. *Emerging Markets Finance and Trade*,44(5), 41-53.

## Appendix

	NIM	CR	DR	IIP	LEV	MGT	NIBR	SIZ	LIQ
NIM	1	-0.38021	-0.0613	0.594827	-0.21871	0.408684	-0.14385	-0.37237	-0.07062
CR	-0.38021	1	0.047287	-0.27946	0.436501	-0.48274	0.26616	0.558575	0.253823
DR	-0.0613	0.047287	1	-0.08525	0.006315	-0.04036	0.248194	0.093311	0.10303
IIP	0.594827	-0.27946	-0.08525	1	-0.23485	0.770877	-0.15735	-0.48381	-0.08813
LEV	-0.21871	0.436501	0.006315	-0.23485	1	-0.35936	0.636579	0.483976	0.327392
MGT	0.408684	-0.48274	-0.04036	0.770877	-0.35936	1	-0.17018	-0.48439	-0.13775
NIBR	-0.14385	0.26616	0.248194	-0.15735	0.636579	-0.17018	1	0.159869	0.295945
SIZ	-0.37237	0.558575	0.093311	-0.48381	0.483976	-0.48439	0.159869	1	0.274828
LIQ	-0.07062	0.253823	0.10303	-0.08813	0.327392	-0.13775	0.295945	0.274828	1

	NIM	CR	DR	IIP	LEV	LIQ	MGT	NIBR	SIZ
Mean	3.3542 3	0.8697 23	0.5745 85	0.0114 31	8.2078 62	0.7015 23	0.2676	0.1061 85	19.867 38
Median	2.92	0.92	0.27	0.01	9.09	0.76	0.21	0.06	19.92
Maximum	17.99	0.98	22.13	0.25	54.54	9.4	2.03	0.58	26.93
Minimum	-0.84	0.03	0	-0.23	0	0	0	-0.03	11.61
Std. Dev.	2.3730 75	0.1546 63	1.7041 36	0.0317 97	8.0454	0.4880 2	0.2099 59	0.1025 67	2.6010 53
Skewness	2.6316 08	- 3.3343 9	8.1070 41	2.3598 57	0.4728 99	8.6761 4	4.1435 38	0.9357 55	0.1734 78
Kurtosis	12.897 56	15.221 89	77.714 35	23.756 32	3.0866 41	157.53 57	25.479 08	3.9457 52	3.6208 61
Jarque- Bera	3403.3 79	5250.0 3	158305 .6	12271. 47	24.430 26	654939 .5	15545. 42	119.08 53	13.700 04
Probability	0	0	0	0	0.0000 05	0	0	0	0.0010 59
Sum	2180.2 49	565.32	373.48	7.43	5335.1 1	455.99	173.94	69.02	12913. 8
Sum Sq. Dev.	3654.8 34	15.524 55	1884.7 48	0.6561 69	42008. 77	154.56 8	28.609 86	6.8275 38	4390.7 95
Observatio ns	650	650	650	650	650	650	650	650	650



Dependent Variable: NIM  
 Method: Panel GMM EGLS (Cross-section random effects)  
 Date: 07/14/17 Time: 06:16  
 Sample (adjusted): 2006 2015  
 Periods included: 10  
 Cross-sections included: 80  
 Total panel (unbalanced) observations: 572  
 2SLS instrument weighting matrix  
 Swamy and Arora estimator of component variances  
 Instrument specification: C CR IIP LEV MGT NIBR CR(-1) IIP(-1)  
 LEV(-1)  
 MGT(-1) NIBR(-1)  
 Constant added to instrument list

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
C	5.070357	0.520306	9.74495	7.61E-21
NIM(-1)	0.364109	0.053764	6.772324	3.19E-11
CR	-2.95605	0.437918	-6.75024	3.67E-11
IIP	36.1971	3.26065	11.10119	4.88E-26
LEV	-0.01827	0.007824	-2.33514	0.019885
MGT	-2.89705	0.36938	-7.84301	2.21E-14
NIBR	1.060529	0.556987	1.904045	0.057412

#### Effects Specification

	S.D.	Rho
Cross-section random	0.179972	0.032501
Idiosyncratic random	0.981927	0.967499

#### Weighted Statistics

R-squared	0.649823	Mean dependent var	2.965434
Adjusted R-squared	0.646104	S.D. dependent var	2.096467
S.E. of regression	1.239169	Sum squared resid	867.5806
Durbin-Watson stat	1.463092	J-statistic	51.08217
Instrument rank	11	Prob(J-statistic)	2.15E-10

#### Unweighted Statistics

R-squared	0.668606	Mean dependent var	3.315947
Sum squared resid	935.0401	Durbin-Watson stat	1.357535