

# Determinants of Credit Risk and Operational Risk in Banking Sector Evidence from Pakistani Banking Sector

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## Abstract

Risk management is what kind of strategies should be adopted to reduce all kinds of risk. Risk the difference between the actual return and the expected return. And credit risks the potential that borrower will fail to meet the obligation. The banking industry of Pakistan is faced with several challenges among them are determinants of credit risk and operational risk. Determinants of credit risk are defined as the factors that may affect the credit risk and determinants of operational risk are defined as the factors that affect the operation of business. Many banks in Pakistan have created credit risk management departments that are responsible for managing the credit risk associated with banking operation. The objective of this study is to evaluate the determinants of credit risk in Pakistani banking sector. The collected data consists of secondary data. Financial data was collected from three banks of Pakistan listed at Karachi stock exchange (KSE) over the period of 17 years from 2000 to 2016. Panel Regression Model was applied to find the cause and effect relationship for the under-consideration issue. The result has shown that credit risk and operational risk have a significant and positive relationship with NPLs, Gearing Ratio, and Operating Efficiency. And Credit Risk and operational risk have positive but insignificant relationship with Liquid Assets (LA). The recommendation of this study is if we pursue proper bank regulations, then the regulation should be backed up by sound credit analysis, and provision for suitable situation of credit loans.

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## Keywords

Operational Risk, Credit Risk, Gearing Ratio, Liquid Assets

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### 1. Introduction

The cost of holding risk is important interest to every organization. In this time period, the stocks that have suffer doubts and qualms in every quality of their operations. In that exceptional time period, many business organizations faced very hard time and especially Pakistan suffers more times such unstable time. One of the best reasons for Pakistani banks' instability is credit risk and the existence of the banks is individually better as compared to other financial states at assessment.

The past 21st century produced and had to face the longest hard time economic contraction same for the applied nations, which had more expensive in 2001s, as the commercial banks had to face the high magnitude of risk.

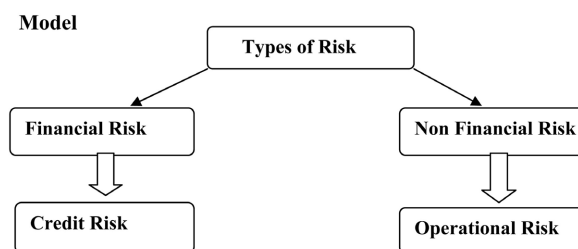
Risk management is an exclusive management method in financial services (Banks). Risk management is struggling every day against uncertainty, and absolutely it is an everyday learning process. Risk is a part of corporate life.

Every day banks face a large amount and different kinds of risk. Banks have a long connection with risk management; for example when making loans deliberating over risk issues. Hence, banks encounter numerous sorts of risk. There are some examples of different kinds of risk, which banks have to face. Market risk, liquidity risk, and solvency risk. The risk has more serious mark effect on Pakistani banking sectors. Which could probably alert and cause the achievement of the banks? There are different kinds of risks but we discuss only two types, financial risk and non-financial risk and just focus on financial risk (credit risk).

#### 1.1. Credit Risk

Credit risk is the level of valuation variation in liabilities tools due to modifications in the implicit loan value of lender and counterpart (Coyle, 2000). According to researcher this type of risk has more significant effect and great impact as compared to other types of risk in Pakistani banking sectors. There are two types of business risks, these are shown in diagram.

In **Figure 1** researcher is focusing on credit risk faced by Pakistani banking sectors and also examines the operational risk (OR) in each aspect. The Pakistani economic market is one of the identical unstable economic markets in the world (Sadaqat, Akhtar, & Ali, 2011). In **Table 1** credit risk is measured with the help of banks' performance. The main supply of credit earning is the process of production (Kargi, 2011). That's why most banks are considering the risk that is the risk of credit through the bank.



**Figure 1.** Types of risk (Sadaqat, Akhtar, & Ali, 2011).

**Table 1.** Variables measurements: (Mehmood et al., 2017).

Variables	Symbols	Formulas
Credit Risk	CR	Total Debts/Total Assets
Operational Risk	OR	
Gering Ratio	GR	Total Debt/Equity
NPLs Ratio	NPLs	NPLs/Total Loans
Operating Efficiency	OE	Total operating Expenses/Total Assets
Liquid Assets	LA	Total Loans/Total Deposits

The major bank problem is to face the operational risk; there are more likely to face and experience the maximum financial crisis. Loans to bank deposit and lending for their loans are available in the current fund announcement (Kashyap, Rajan, & Stein, 1999). Operational risk is the most dangerous threat and challenge for Pakistani banks so for that attracts banks and successes of business alone are increasingly exposed to the specific capacity, preparation and efficient performance of this particular threat (Gieseche, 2004).

This research stressed on major causes of bank failure due to the fast growth of operational risk in bank (Hooks, 1994). Looking at the risk of marketing and risk of lending within its central corporation, bank's success depression and they are not able to test, monitor and manage the trials in the tested manner. Banks have attempted to expose risk management planes that could potentially gain more importance as well as the risk of receiving money. Financial organization have faced many issues for various purpose over many years, however the main reason for banking problems are mainly to raise measures for debt lender and agree against parties, well the risk of integrated portfolio not connected, inadequate satisfaction, is momentum and integration by commercial or other environments that can be ordered in the direction of bad operational within bank positioning of bank counterpart (Gil-Diaz, 1998).

In operational, generally, the risk is recognized and it is familiar, as it is the most reliable and fast within the nature developed through many financial risks within the bank face (Sackett & Shaffer, 2006). Financial risk expensive through a well-organized and effective management of debt risk does not support the effective management of financial institutions (Banks) merely the ability and productivity of their own industries (Psillaki, Tsolas, & Margarities, 2010).

The aim of this study is to interpret the cause of credit risk and how to manage credit risk and what kind of management techniques are adopted by commercial banks of Pakistan? This study also aims to examine what kind of risk are faced by commercial banks in Pakistan and what is the effect of credit risk on the performance of banks in Pakistan. On the other hand, we are focusing on that what kind of strategies should be adapted to control and reduce the operational risk.

## 1.2. Operational Risk

Operation risk associated with people, systems, processes and external events is one of the great challenges for banks all over the world. During the last couple of years, the banking sector has sophisticated and minimized extensive losses due to operational risk.

In order to overcome operational risk, the organization must maintain a good operational risk management workforce to prevent such crises. Although operational risk is comparatively new to the banking sector, now it has become a significant part of any banking institution's risk department. With good operational risk management, an organization manages its risk successfully. Operational risks—while not new, but in new surroundings—have received tremendously increased attention just recently. Operational risk is defined as the vulnerability of enterprise as an outcome of carrying out it in an improper or insufficient kind, and may outcome from external factors.

Regardless of the actuality in the field of finance, management and establishment of risks have regularly been a first intention of the finance overtly within organizational growth and check capacity; non-financial risk authorities have been unhappily for the majority fraction unnoticed (Sadaqat, Akhtar, & Ali, 2011). Operational risk varies from the entire extra varieties of risk because it negotiations intrinsically with very well-organized means rather than supervising unfamiliar environments (Frame, 2003). The amount and management of nonfinancial risk are equitably deviating and distinct from other types of banks' associated economic risks. The various natural world of nonfinancial risk either from interior/exterior intervention to business organization pursuits makes demanding systematic and sound measurements with constraints (Jobst, 2007). In recent times, risk control is the most main factor of any organization and especially integral for banking sector; because banking is one of the risky businesses in the world. For the management of such types of risks, organizations must have well-organized and competent risk management workforce, because effective risk management does not happen automatically. The aim of my research work is to evaluate the impacts of operational and credit risk on the overall result of performance of banks in Pakistan more than a time span of 17 years (2000-2016).

The remainder of the research work is outlined as follow-section two is the objective of the study, section four discusses the reviews of literature, section five focuses on methodology, section six focuses on data analysis and interpretation of findings and section seven presents the conclusion and recommendations.

### 1.3. Problem Statement

Credit risk (CR) and Operational risk (OR) greatly affect the banking sectors and economies of the whole world including the banking sectors of Pakistan. Pakistani banking industry needs to be addressed properly to avoid such unstable situation.

### 1.4. Research Question

This study is going to answer the following question.

What are the determinants of credit risk and operational risk that influence the operational risk in Pakistani banking sector?

## 2. Reviews of Literature

This section covers the past investigation work on this topic credit risk. This literature is based on ideological framework.

### 2.1. Credit Risk

Risk management practices are considered a key factor for determining the performance of the organization, and in the case of commercial banks, this kind of technique will forecast the efficiency and effectiveness of management. Risk hedging skills and management functions of planning, organizing, leading, and controlling are especially important for South Asian economies (Mujtaba, 2013) as the public often hears cases of corruption. A number of studies have provided the discipline in the practice of risk management within the banking sector but there is a variation in researchers' views about this issue.

Prior literature on risk management in banking sector supported by studies of Brown and Wang (2002) investigated credit risk management in Interstate bank corporations. The sample of this study is from the first Interstate bank corporation. The result showed that hedging duration and credit spreads have considerable impact on risk management practices. Hedging option reduces credit risk. The study provided that credit risk management in the banking sector is very important because banks play an important role in the economy of the country. Barnhill Jr. et al. (2002) found that the credit risk factor is a key issue in case of financial stress. However, the organizations can overcome this issue by appropriate portfolio management techniques for getting economies of scale and better results in case returns. Lehar (2005) concentrated on measuring systematic risk in Austria. Data was collected from a sample of the largest 149 international banks from 1988 until 2002. Systematic risk was measured by using correlation and regression analysis and found that the high systematic risks in the banking sector will result in high variations in the expected deficit. He used the stock market information and found the joint dynamics of the Bank's asset portfolio to a sample of international banks. An increase in equity results in a significant decrease in systematic risk. Well-capitalised banks further reduce equity, not the systematic risk.

A bank performance has two functions; to collect one and as well as to provide credit risk facilities, so it is not exposed to credit risk. One of the major threats of financial risk is that the industry is satisfied with the prosperity of its industry and it is riskier with accurate measurement and efficient management (Gieseche, 2004).

There are different variables in the way of living outstanding balance as well as liability methods to modify the clear debts aspects of credit risk lender and counterpart (Coyle, 2000). Redirecting the credit risk is because credit consumers have to pay the full-fledged and timely completion of their instability.

This study indicates negligence of account availability due to the risk of lending financial (Credit) due to the country's financial institutions (Barry, Baker, & Sannit, 1981).

(Deakins & Hussain, 1994) they emphasized in the risk assessment method, combined funds and funds in time; thus unlikely to reduce the potential selection for banks within the curve, but in the right and durable client relationship it is in the right direction and also shows the distance.

In addition, there is a major cause of bank failure is a risk, with this demand of financial crises in commercial banks, with the demands of high financial debt (Barnhill, Papanagious, & Schumacher, 2002).

The research has detected related to loans; large size of banks (Financial institution) is a very significant risk factor (Brown & Wang, 2002). Moderate to accept the choice of transferring transaction as well as huge financial risk of contributing to a long-term contribution to the "bonds" loan.

This study determines harmful shareholder risk and is more profitable than the risk of such banking (financial) risk, while the Australian state board sees the governments with the main objective of the risk of financial saving, and it is possible (Peter & Peter, 2006).

The researcher also investigates the financial risk executive by mega American financial school, a single most credible entrance to the debt risk setting is to face yard stack, and to agree with it (Fatemi & Fooladi, 2006).

## 2.2. Operational Risk

The term "operations risk" was formally invented and coined in 1991 by the COSO report. Wiseman and Catanach (1997) acknowledged that institutions need to convey authority and formulate ideas for modeling risk, and found them as both exactly affiliated and interlinked through the preference of treatment. (Ray & Cashman, 1999) declared operational risk (nonfinancial risk) consequences conclusion producing into many modes, and moreover, risk evaluation is regarded essential both from market member's concern and scheme associated perspective.

The study extend this stream of literature on foreign exchange risk and operational risk along with credit risk pioneer by Al-Tamimi and Al-Mazrooei (2007), as they studied the banking risk by taking the sample of 17 banks of UAE and

used a primary source of data through questionnaires and Pearson correlation and regression model. They investigated operational risk, credit risk and foreign risk that are faced by the United Arab Emirates commercial banks. The findings indicated that the practice of risk monitoring, analysis, controlling and assessments matters for a shield against risk and these practices may vary from circumstance to circumstance. Another study supports this objective that is [Demirovic and Thomas \(2007\)](#), who studied the credit risk management of the United Kingdom listed companies. The sample of this study was the United Kingdom listed companies over the period from 1990 to 2002. To test the data Regression analysis was used and the result indicated that for measuring the credit risk important factor is the size of the firm and all other factors remain the same or no effect on the credit risk. In the case of non-financial firms in Pakistan the derivatives are considered proper risk management practices ([Chaudhry et al., 2014a](#)).

Although research minimizes nonfinancial threat in the United Kingdom trade financial institutions “banks” ([Blacker, 2000](#)) particularly toward reduction of nonfinancial threat keeps comprehensive progressions links along with system, technology and populace. The study described duty for nonfinancial risk reduction lies among business unit, as confines were relaxed upon business entity, which assured the minimization of nonfinancial risk. [Elliott et al. \(2000\)](#) identified nonfinancial risks like architecture of institution, as well as the gibbet into which nonfinancial risk functions. [Cornalba and Giudici \(2004\)](#) identified that banks are glancing towards admix both qualitative data and quantitative data of accelerated measurement predetermined approximately towards quantity functional risk. [Power \(2005\)](#) pointed out that inconsistency and dilemmas the nonfinancial risk design, while being ingredients toward maximizing imposed self-parameter in the operation of the banking industries. Research pursued and understood to Basel II banking policies have effectively institutionalized the model of nonfinancial risk with force in three (3) major parts; i.e. facts and numbers assemblage, definitional affairs and scopes of quantification to display the paramount significance of nonfinancial risk.

Likewise, ([Flores & Ponte, 2006](#)) stressed that usage of learning system or also called information system (IS), and distilled size to attempt novel policies and tools for organizing and systematizing nonfinancial risk.

[Laviada \(2007\)](#) asserted to well-define means of nonfinancial risk administration will focus and reintegrate organizational interior controls. The study furthermore emphasized to focus interior review for the entire means of culmination and execution expressly for schematizing nonfinancial risk.

Different researchers had investigated the risk management in the case of different countries and found different phenomenological ideas related to the under consideration issue. [Selma et al. \(2013\)](#) investigated risk management in Tunisian commercial banks. They surveyed 16 commercial banks through a questionnaire. The data were analyzed using descriptive statistics, one sample t-test



and Friedman test. The main results are that Tunisian banks are practicing the tools and also know about the importance and role of effective risk management and don't use wide economic capital and market VAR for different risk types. The role of transparency is well known by the Tunisian bankers and also found that risk management is an ongoing process and will be developed in the future, past and present. Risk information is disclosed in the financial statements according to Basel II. However, the contribution of information towards risk management is of significant importance (Chaudhry et al., 2014b).

### **3. Methodology**

#### **3.1. Research Methodology**

This research provides the parameters by selecting the methodology of investigation, especially examining credit and operational risks in commercial banks of Pakistan. Data collection methods, kind of different tools for measuring, and also providing the path for managing the measure, are all important factors. For the depth analysis of said assertions, which was already introduced use the quantity techniques. How the issue was resolved is also described in detail.

The research will analyze the investigative question within an interpreted vision with a descriptive approach.

#### **3.2. Research Design**

For this research, the researcher will use multi-variant regression model to check implication of variables on operational along with credit risks as well as regression study is used in presentation, management and study of empirical outcomes.

#### **3.3. Population and Sample Size**

The bane of research is to empirically analyze the "quantitative" effects of credit and operational risk on the recital of financial institutions "banks" in Pakistan, across the time span of sixteen years (2000-2016). Three banks were selected from the banks whose names are HBL, MCB, NBP, MEEZAN, ASKARI, BOP, BOK, and ALLIED bank.

This study considers the data for the time of 2000-2016; the sample consisted of 08 commercial banks in Pakistan. For this study, selection includes HBL, MCB, NBP, MEEZAN, ASKARI, BOP, BOK, and ALLIED bank.

#### **3.4. Source and Data Collection**

To facilitate the study of a particular case, the data will be gathered and retrieved from different sources. The data was sourced from the annual reports (financial statement) of banks as well as from State bank of Pakistan official website for the sample. The data includes both cross-sectional and time-series data; therefore, it is pooled into a panel data set and estimated using Panel Data regression.



### 3.5. Variables

This study consists of five variables, in which one is dependant and four variables are independent.

### 3.6. Dependent Variable

In this research, the dependent variables are Credit Risk (CR) and Operational Risk (OR).

### 3.7. Independent Variables

Independent variables are Gearing Ratio (GR), NPLs Ratio, Operation Efficiency (OE), and Liquid Assets (LA).

### 3.8. Variables and Their Symbols

**Table 1** shows a case study of Pakistani commercial banks”.

### 3.9. Research Model

In this study, two dependent variables are used i.e., operational and credit risk and corporate analysis for the applications of independent variables.

#### Model (I):

##### Financial Risk

$$\text{Credit Risk} = \alpha + \beta_1\text{GR} + \beta_2\text{NPLs} + \beta_3\text{OE} + \beta_4\text{LA} + \epsilon$$

#### Model (II):

##### Non-Financial Risk

$$\text{Operational Risk} = \alpha + \beta_1\text{GR} + \beta_2\text{LA} + \beta_3\text{OE} + \beta_4\text{NPLs} + \beta_5\text{LNTA} + \epsilon$$

## 4. Data Analysis

### Empirical Result with Credit Risk

To select the model between common effect and fixed effect model, we use F value. If F value is greater than 2 then we will use common effect model. To select model between fixed effect and random effect, I will use Housman test. If the result of Housman test is significant we will use random effect model. In this result, we have  $F = 3.43$ .

**Table 2** shows the empirical finding of this model of business risk is depicted to 0.43 value in the case of Adjusted R square which meant that 43% of the variation is due to the hypothesized model of this particular research which confirms the relevancy of the results. The regression model shows the F-Statistic = 26.80 and  $p < 0.005$ , which means that the model is significant. As can be seen that credit risk is significant and positive regression values with GR. NPLs and Bank size had a negative and insignificant relationship with credit risk.

**Table 3** shows the Housman test that which model is appropriate for our study between fixed effect and random effect models.

**Table 4** shows empirical finding of this model of business risk is depicted to

0.74 value in the case of Adjusted R square which meant that 76% of the variation is due to the hypothesized model of this particular research which confirms the relevancy of the results. The regression model shows the F-Statistic = 37.26 and  $p < 0.005$ , which means that the model is significant. As can be seen that credit risk is significant and positive regression values with GR, NPLs and Bank size had negative and insignificant relationship with credit risk.

**Table 2.** Fixed effect model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRATIO	0.914954	0.331002	2.764190	0.0066
NPL	3.638980	1.674726	2.172881	0.0317
OEFF	2.173700	3.822912	0.568598	0.5707
LA	86.42391	45.84786	1.885015	0.0618
C	-1771.621	3639.995	-0.486710	0.6273

**Table 3.** Housman test.

Test summary	Chi-sq. statistic	Chi-sq. D.f	Prob.
Cross-section random	204.192231	4	0.0000

**Table 4.** Fixed effect model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRATIO	0.038778	0.010233	3.789676	0.0002
NPL	-0.032254	0.051772	-0.623002	0.5344
OEFF	0.331291	0.118181	2.803263	0.0059
LA	1.521467	1.417331	1.073473	0.2851
C	176.0714	112.5260	1.564717	0.1202

## 5. Conclusion

This research work determines the variables that affect credit risk in Pakistani banking sector. That's why this research work applied credit risk and operational risk as a dependent variable and other variables GR, NPLs, LA and OE as independent variables. This study has identified the variables that are of considerable impact and are of significant importance in the case of credit risk in commercial bank of Pakistan.

The result has shown that CR (credit risk) and operational risk (OR) have a positive relationship with all independent variables (GR, NPLs, LA, and OE). But credit risk has a weak positive relationship with (GR, NPLs, and LA). Credit risk (CR) has only strong positive relation with operating efficiency (OE).

## 6. Limitation of the Study

My study sample size consists of 8 banks, and a time period of 17 years. I took a

small period of time due to the shortage of time. 17 years of data show a significant and positive result. This topic is more interesting as compared to other topics. If someone is interested to do research on this topic, I advised him/her to take the data from 1990 and he should increase the size of his/her sample means selecting more banks as a sample size. He/she will get a more positive and significant result.

## 7. Recommendation

This study recommends that, if we follow the appropriate banks' rules, and the rules should be supported by correct credit analysis and appropriate provision of credit loan conditions. To avoid exposing the actual offer of the bank's financial position on their balance sheet, and for compensation for portfolio activities, the organization should consider credit analysis and bring it into account for seasonal and challenging phase of economy, and should be debt with proper portfolio management as well. Debt evaluation performance techniques (ELAT) are included in conventional investment analysis and risk management.

## 8. Future Work

In future work, I recommend some suggestions for other interested people in this topic. I took only eight banks, these are HBL, MCB, NBP, MEEZAN, ASKARI, BOP, BOK, and ALLIED banks as a sample, my dependent variables are Credit Risk and operational risk and independent variables are Gearing Ratio, NPLs, Liquid Assets, and Operating Efficiency and I got the positive and significant result by using panel regression model. So I suggest to other interested people that if he took more banks as a sample, and he should increase the time period of data, he will get a more significant and positive result.

In this manuscript, authors have contributed and their contributions are as follows.

We are very thankful to Dr. Javid Ali Khan (Hainan University, China) for helping us with methodology and analysis. (IAK): The principal author carried out the writing of the introduction, literatures, methodology and conclusion parts, as well as design, organized, drafted and alignment the manuscript. In addition to this, all the authors revised the whole manuscript twice including "results and discussion part" and carried out all correspondence with journal editor, etc. (Sehrish, Jahangir Faiz) carried out statistical analysis and helps us in writing the "results and discussion parts. Sidra Khan and Major Sohail help in collecting literature and data. All authors read and approved the final manuscript.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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