A STUDY ON ASSESSING PORTFOLIO CREDIT RISK CHANGES IN A SAMPLE OF LARGE AND COMPLEX BANKING GROUPS IN REACTION TO MACROECONOMICS SHOCKS

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for the award of the degree of

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To

DELHI TECHNOLOGICAL UNIVERSITY

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Certificate

We Ms.Anubha ,Ms.Kajal, Ms.Shipra, certify that the Project Report/Dissertation (MS-202) entitled "A Study on Assessing Portfolio Credit Risk Changes in a Sample of Large and Complex Banking Groups in Reaction to Macroeconomics Shocks" is done by me and it is an authentic work carried out by me at Delhi Technological University. The matter embodied in this project work has not been submitted earlier for the award of any degree or diploma to the best of my knowledge and belief.

Signature of the Student
Date:

Certified that the Project Report/Dissertation (MS-202) entitled "A Study on Assessing Portfolio Credit Risk Changes in a Sample of Large and Complex Banking Groups in Reaction to Macroeconomics Shocks" done by Ms.Anubha, Ms.Kajal, Ms.Shipra, is completed under my guidance.

Signature of the Guide
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Director/Project Coordinator

ACKNOWLEDGEMENT

It gives me immense pleasure to present the report of my project titled "**A STUDY ON ASSESSING PORTFOLIO CREDIT RISK CHANGES IN A SAMPLE OF LARGE AND COMPLEX BANKING GROUPS IN REACTION TO MACROECONOMICS SHOCKS**".

This work would not have been possible without the assistance and guidance of a number of people. I would like to take this opportunity to thank each and every one of them.
The work presented in the dissertation is the outcome of the guidance and inspiration of my guide **Mrs. Harleen Kaur**, Assistant Professor, Delhi Technological University,Bawana ,Rohini. Her continuous encouragement during difficult times and expert advice has made this research see light of the day.

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EXECUTIVE SUMMARY:

The report contains the brief description of the Portfolio Credit Risk Changes in a sample of large and complex banking groups in reaction to macroeconomic shocks. This report attempts to address the issue of measuring portfolio credit risk in the Indian banking sector using an approach based on publicly available data. By linking publicly available bank exposure data to information received from a global macroeconomic model the study is able to simulate the effects of different macroeconomic shocks on corporate sector credit quality/default probabilities.

The study was conducted with the objective to understand the impact of macroeconomic shocks on credit risk profiles of the banks, and to achieve that data relating to macroeconomic shocks and risk of the banks. The statistical tool opted to achieve the objective are Correlation and Z-test. Where, correlation helped in understanding the relationship between the macroeconomic shocks and the stock prices of the banks; Z-test helped in analyzing the deviation of these variables from the normal distribution.

The study conducted resulted in understanding the impact of macroeconomic shocks on the stock prices of the banks. It was founded that there was a very less correlation among the banks stocks and macroeconomic shocks. And it was found that the credit risks of them are negative, which means that the risk was less than average. The study leads to understanding the effects of the macroeconomic environment on the risk factors of the banking industry.

CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

S.NO.	Abbreviated name	Full name
1.	GDP	Gross domestic product
2.	Sig.	Significance
3.	VaR	Value-at-risk

Chapter 1

AIM:

A STUDY ON ASSESSING PORTFOLIO CREDIT RISK CHANGES IN A SAMPLE OF LARGE AND COMPLEX BANKING GROUPS IN REACTION TO MACROECONOMICS SHOCKS

OBJECTIVE:

The study was conducted with the objective to understand the impact of macroeconomic shocks on credit risk profiles of the banks, and to achieve that data relating to macroeconomic shocks and risk of the banks. The statistical tool opted to achieve the objective are Correlation and Z-test. Where, correlation helped in understanding the relationship between the macroeconomic shocks and the stock prices of the banks; Z-test helped in analyzing the deviation of these variables from the normal distribution.

INTRODUCTION

1.1 Overview

This study presents a framework that allows for stress-testing large banks credit risk exposures using publicly available data. In that context, the impact of a range of shocks generated by a macro econometric model on banks. Credit portfolios can be assessed and the relative severity of the shocks can be ranked in terms of credit value-at-risk.

1.2 Industry Background

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Banking in India originated in the last decades of the 18th century. The first banks were The General Bank of India which started in 1786, and the Bank of Hindustan, both of which are now defunct. The oldest bank in existence in India is the State Bank of India, which originated in the Bank of Calcutta in June 1806, which almost immediately became the Bank of Bengal. This was one of the three presidency banks, the other two being the Bank of Bombay and the Bank of Madras, all three of which were established under charters from the British East India Company. For many years the Presidency banks acted as quasi-central banks, as did their successors. The three banks merged in 1921 to form the Imperial Bank of India, which, upon India's independence, became the State Bank of India.

Foreign banks too started to arrive, particularly in Calcutta, in the 1860s. The Comptoire d'Escompte de Paris opened a branch in Calcutta in 1860, and another in Bombay in 1862; branches in Madras and Pondicherry, then a French colony, followed.

HSBC established itself in Bengal in 1869. Calcutta was the most active trading port in India, mainly due to the trade of the British Empire, and so became a banking center. The Bank of Bengal, which later became the State Bank of India.

ICICI Bank is an Indian multinational bank and financial services company headquartered in Mumbai. Based on 2013 information, it is the second largest bank in India by assets and by market capitalization. It offers a wide range of banking products and financial services to corporate and retail customers through a variety of delivery channels and through its specialized subsidiaries in the areas of investment banking, life and non-life insurance, venture capital and asset management. The Bank has a network of 3,539 branches and 11,162 ATM's in India, and has a presence in 19 countries.

HDFC Bank Limited is an Indian financial services company based in Mumbai, Maharashtra. It was incorporated in 1994. HDFC Bank is the fifth largest bank in India by assets. It is also the largest bank in India by market capitalization as of 29 January 2014. The bank was promoted by the Housing Development Finance Corporation, a premier housing finance company (set up in 1977) of India.

The State Bank of India (SBI) is the oldest and largest bank in the country. Its origins go back to the first decade of the 19th century, when the Bank of Calcutta was established on 2 June 1806. The bank got its present name after an Act of Parliament in May 1955 and the State Bank of India was constituted on 1 July 1955. Today, SBI has a phenomenal 9,559 branches and its ATM network is spread across 6,473 of its own locations& total 8,000ATMs including of those of its associate banks. State Bank of India is a successor to Imperial Bank of India, which was established in 1921.The bank, came into being on 1.7.1955 through the State Bank of India Act, 1955. States of India joined the State Bank Group, as subsidiaries under the State Bank of India (Subsidiaries Banks) Act, 1959.

Oriental Bank of Commerce India was established in the year 1943 on 19th February in Lahore. After partition, Oriental Bank of Commerce shifted its Registered Office from Lahore to Amritsar paying every rupee to its departing customers. The bank was nationalized on 15th April, 1980.

1.3 Objectives of Study

The objectives of report are as follows –

a. To adopt credit risk and modeling techniques to assess risk position.
b. To develop a tool to monitor credit risk in large and complex banking groups.
c. To understand the impact of macroeconomic shocks on credit risk profiles of the banks.
d. To understand the concept of credit risk with regard to banking industry.
e. To understand the macroeconomic shocks that affects the economy.

1.4 Scope of the Study

Principal aim is to gather and collate information from the literature and from leading researchers with the objective of understanding portfolio credit risk associated with the 4 banking industry. The scope of the report is limited to understanding credit risk and credit risk techniques.

1.5 Methodology

In our research, the researcher studies the major public and private players in the banking sector namely:

Public Sector Banks – State Bank of India, Oriental Bank of Commerce
Private Sector Banks – ICICI Bank, HDFC Bank

Secondary data is being used in the study. Secondary data is data collected by someone other than the user. Common sources of secondary data for social science include censuses, organizational records and data collected through qualitative methodologies or qualitative research. Secondary data analysis saves time that would otherwise be spent collecting data and, particularly in the case of quantitative data, provides larger and higher-quality databases that would be unfeasible for any individual researcher to collect on their own.

Researcher has chosen z-test and correlation in the study. A ***Z*-test** is any statistical test for which the distribution of the test statistic under the null hypothesis can be approximated by a normal distribution. Because of the central limit theorem, many test statistics are approximately normally distributed for large samples. For each significance level, the *Z*-test has a single critical value (for example, 1.96 for 5% two tailed) which makes it more convenient than the Student's *t*-test which has separate critical values for each sample size. Therefore, many statistical tests can be conveniently performed as approximate *Z*-tests if the sample size is large or the population variance known.

Sampling technique	Convenience sampling
Data sources	Secondary data
Statistical tools	Ztest and correlation
Reseach design	Analytical and Descriptive
Tools	SPSS and MS excel

1.6 Hypothesis

Ho1: There is no impact of macroeconomic shocks on credit risk profiles of the banks.

Ha1: There is an impact of macroeconomic shocks on credit risk profiles of the banks.

Ho2: There is no relationship of macroeconomic shocks and default probabilities of the Bank

Ha2: There is a relationship of macroeconomic shocks and default probabilities of the Bank

This chapter lay down the basic framework of Banking Industry which includes the industry background and introduction of the portfolio of banks. It has also covered the objective of the study which gave the right path for the study and scope of the study and this helped in collection of data and estimating time duration. At last the methodology of the project and hypothesis was determined that set the guidelines for further project.

Chapter 2

LITERATURE REVIEW

Literature Review

It is relevant to refer briefly to the previous studies and research in the related areas of the Subject to find out and to fill up the research gaps, if any. Literature on banking services can generally be found; a number of books are available on banking related aspects as merchant banking, loan syndication, securitization, profitability and productivity etc. but, few studies are undertaken portfolio credit risk of the banks and impact of macroeconomic shocks on credit risk profile of the banks.

Arora (2012) studies the impact of size on credit risk management strategies in commercial banks. The study concludes that Credit Risk Management (CRM) has come under increasing scrutiny in both academia and practice. It is commonly believed that CRM strategies followed vary with bank-specific characteristics. However, a study focusing on examining the association between size of the bank and CRM strategies in India does not seem to have been attempted so far. The findings obtained using discriminate analysis together with chi-square test suggested significant association between the size of bank and some of the CRM strategies. The findings also indicated that a mix of the credit risk avoidance, credit risk mitigation and credit control approach was commonly followed by all the sample banks, irrespective of their size.

Dewatripont and Triole (2012) aims to understand macroeconomic shocks and banking regulations. Further, studied that the recent crisis has brought to the fore the cyclical properties of banking regulation. Countercyclical buffers and enhanced capital requirements meant to stabilize banks' balance sheets across the cycle are not costless, and a delicate balance needs to be reached between providing incentives to generate value and discouraging excessive risk-taking. The paper develops a model in which, in contrast with Modigliani-Miller, outside equity and capital requirements matter. It analyses banking regulation in the presence of macroeconomic shocks and studies the desirability of self-insurance mechanisms such as countercyclical capital buffers or dynamic provisioning, as well as "macro-hedges" such as CoCos and capital insurance.

Gumparthi and Praseela (2012) examine the credit risk assessment model for large banks and found that the need to reduce the banks Non-Performing Asset (NPA) level to match the competitors forms the primary reason/backbone for the development of the model. Also, the absence of appropriate weights in the current system triggered the need for the development of the same. The Model was constructed using a two step method. Risks were assessed using a comprehensive risk score card. Discriminant analysis was used to classify objects/records into two or more groups based on the knowledge of some variables related to them. The analysis was used for classification of assets into performing and non-performing based on the factors identified from the risk score card.Under the Discriminant model, population size was 70 clients of corporate banking branch. Discriminant scores and classification score aided in the classification of the clients. A total of 24 cases were taken for the validation of the model of which 21 clients are good, ongoing records while 3 clients are NPAs.

Mileris (2012) study the macroeconomic determinants of loan portfolio credit risk. Researcher found that the credit risk is one of the main risks in commercial banks and the ability to manage it meaningfully affects banks' stability. This risk arises due to the particular reasons related to the possibility to lose loans if the debtors are not able to meet their financial obligations. When making the decisions of financing the loan applicants, banks use the credit risk assessment models that allow estimating the probability of the potential borrowers to default on their loan commitments. The main goal of managing the credit risk in banks is to compound the loan portfolio of the acceptable risk level. When assessing the credit risk of every company, banks usually analyze the financial data and some qualitative factors as the independent variables in the statistical credit risk assessment models. But in changing the credit policy in banks and pricing the credits, it is very important to predict the quality of loan portfolio in future. The problem can be summarized as finding the statistical methods that relates the proportion of doubtful and non-performing credits in the loan portfolio (dependent variable) with the set of explanatory variables (macroeconomic information of a country).

Patra (2012) study the value at risk methodology in Indian banking scenario. Researcher explains that value at risk (VaR) is a new technology in financial engineering which helps to measure the risk in the financial world. It can be defined as the maximum possible loss associated with a financial instrument within a given period of time and with a given confidence level. This VaR methodology became very much popular after the formation of the Basel Committee on Banking Supervision in 1995. This paper analyzes the different methods of VaR calculation, and empirically tests it in the context of Indian banking sector. It studies the historical data of Indian banking sector and looks into the structural breaks found in the industry. In all, the paper divides the entire study period, i.e., 2003-2011, into four structural shifts and looks into risk attached to each time period. It shows that calculated risk in different time periods validates the economic scenario prevalent during that period. It also suggests the best methodology for VaR calculation in different time periods.

Bandopadhyay and Bandopadhyay (2010) explain that the overall risk of a bank depends on many factors. In this paper, the researcher investigate how group characteristics and bank-wise individual factors (credit policy, extent of hedging) influence the risk of a bank and how they vary with time. Initially researcher used coefficient of variation and K-means cluster analysis to explore the nature of the data. Further, researcher attempted a mixed modeling strategy to model the net interest margin values, treated as a surrogate of the exposed risk of a bank. The estimates of mixed model suggested that although there was an observed group-wise disparity in the level of risk, risk is more sensitive toward the individual characteristics of the bank. It was also observed in the study that the temporal effect on group-wise characteristics and individual bank characteristics is minimal in determining their influence on the exposed risk of a bank. The study indirectly demonstrates why Indian banks are almost unperturbed even in the backdrop of collapse of big banks in US and Europe.

Mallick (2010) investigates the role of nominal exchange rate and macroeconomic shocks in influencing monetary policy, long-term interest rate and fiscal policy in a structural vector-autoregressive (SVAR) model of the Indian economy, along with examining the impact of monetary and fiscal policy shocks. A theoretical setting has been developed and the model predictions have been estimated using quarterly data 1996:2 –2009:1, identifying structural shocks along with carrying out variance

decomposition of different shocks. There is strong evidence of exchange rate shocks being exogenous, given the regular intervention by the Central Bank in the FX market. Exchange rate, supply and monetary policy shocks influence inflation more than the demand shocks. To further validate these results, researcher identify monetary and exchange rate shocks separately within a sign-restriction based VAR to demonstrate the case of exchange rate targeting by restricting it not to appreciate, which in part explains the persistent inflation at high single-digit levels in India.

Blank and Dovern (2009) analyze what macroeconomic shocks affect the soundness of the German banking system and how this, in turn, feeds back into the macroeconomic environment. Recent turmoil's on the international financial markets have shown very clearly that assessing the degree to which banks are vulnerable to macroeconomic shocks is of utmost importance to investors and policy makers. Researcher proposes to use a VAR framework that takes feedback effects between the financial sector and the macroeconomic environment into account. Researchers identify responses of a distress indicator for the German banking system to a battery of different structural shocks. Researchers find that monetary policy shocks, fiscal policy shocks, and real estate price shocks have a significant impact on the probability of distress in the banking system. Researchers identify some differences across type of banks and different distress categories, though these differences are often small and do not show any systematic patterns.

Bodla and Verma (2009) studies the credit risk management framework at banks in India and found that Credit risk emanates from a bank's dealings with an individual, corporate, bank, financial institution or a sovereign. The paper is designed to study the implementation of the Credit Risk Management Framework by Commercial Banks in India. To achieve the above mentioned objective a primary survey was conducted. The results show that the authority for approval of Credit Risk vests with 'Board of Directors' in case of 94.4% and 62.5% of the public sector and private sector banks, respectively. This authority in the remaining banks, however, is with the 'Credit Policy Committee'. For Credit Risk Management, most of the banks (if not all) are found performing several activities like industry study, periodic credit calls, periodic plant visits, developing MIS, risk scoring and annual review of accounts. However, the banks in India are abstaining the use of derivatives products as risk hedging tool. The survey has brought out that irrespective of sector and size of bank, Credit Risk Management framework in India is on the right track and it is fully based on the RBI's guidelines issued in this regard. Castren et al. (2009) found that in terms of regulatory and economic capital, credit risk is the most significant risk faced by banks. Researchers implement a credit risk model based on publicly available information with the aim of developing a tool to monitor credit risk in a sample of large and complex banking groups (LCBGs) in the EU. The results indicate varying credit risk profiles across these LCBGs and over time., the results show that large negative shocks to real GDP have the largest impact on the credit risk profiles of banks in the sample. Notwithstanding some caveats, the results demonstrate the potential value of this approach for monitoring financial stability.

Ahmad and Ariff (2007) present fresh findings about key determinants of credit risk of commercial banks in emerging economy banking systems compared with developed economies. Australia, France, Japan and the US represent developed economies; emerging economies are India, Korea, Malaysia, Mexico and Thailand. Credit risk theories and empirical literature suggest eight credit risk determinants. Researchers find anywhere from two to four factors are alone significantly correlated with credit risk

of any one banking system. Regulatory capital is significant for banking systems that offer multi products; management quality is critical in the cases of loan-dominant banks in emerging economies. Contrary to theory or studies, researchers find leverage is not correlated with credit risk in our test period. Data transformations and statistical corrections ensured these results are reliable: Model robustness was tested using AIC. The model developed here could be applied to test more emerging economy banking systems to generalize our findings to other economies.

Bandyopadhyay (2007) developed a credit scoring model for agricultural loan portfolio of a large Public Sector Bank in India and suggest how such model would help the Bank to mitigate risk in Agricultural lending. The logistic model developed in this study reflects major risk characteristics of Indian agricultural sector, loans and borrowers and designed to be consistent with Basel II, including consideration given to forecasting accuracy and model applicability. In this study, researcher have shown how agricultural exposures are typically can be managed on a portfolio basis which will not only enable the bank to diversify the risk and optimize the profit in the business, but also will strengthen banker borrower relationship and enables the bank to expand its reach to farmers because of transparency in loan decision making process.

Das and Ghosh (2007) examines the determinants of credit risk of banks in emerging economies Using advanced panel data techniques, the paper seeks to examine the factors affecting problem loans of Indian state-owned banks for the period 1994-2005, taking into account both macroeconomic and microeconomic variables. The findings reveal that at the macro level, GDP growth and at the bank level, real loan growth and bank size play an important role in influencing problem loans. The study performs certain robustness tests of the results and discusses several policy implications of the analysis.

Bandyopadhyay (2006) aims at developing an early warning signal model for predicting corporate default in emerging market economy like India. He also presented the method for directly estimating probability of default using financial and non-financial variable. For predicting corporate bond default multiple discriminant analysis is used and logistic regressions model is employed for estimating Probability of Default (PD). The author concluded that by using 'Z' score model, banks and investors in emerging markets like India can get early warning signals about the firm's solvency status and reassess the magnitude of default premium they require on low grade securities. The PD estimate from logistic analysis would help banks to estimate credit risk capital and set corporate pricing on a risk adjusted return basis. This model has high classification power of sample and high prediction power in terms of its ability to detect bad firm in sample.

Basurto and Padilla (2006) study the Portfolio Credit Risk and Macroeconomic Shocks. The study concludes that Portfolio credit risk measurement is greatly affected by data constraints, especially when focusing on loans given to unlisted firms. Standard methodologies adopt convenient, but not necessarily properly specified parametric distributions or simply ignore the effects of macroeconomic shocks on credit risk. Aiming to improve the measurement of portfolio credit risk, researcher propose the joint implementation of two new methodologies, namely the conditional probability of default (CoPoD) methodology and the consistent information multivariate density optimizing (CIMDO) methodology. CoPoD incorporates the effects of macroeconomic

shocks into credit risk, recovering robust estimators when only short time series of loans exist. CIMDO recovers portfolio multivariate distributions (on which portfolio credit risk measurement relies) with improved specifications, when only partial information about borrowers is available. Implementation is straightforward and can be very useful in stress testing exercises (STEs), as illustrated by the STE carried out within the Danish Financial Sector Assessment Program.

Despande and Iyer (2006) consider an enhancement of the Credit Risk+ model to incorporate correlations between sectors. This is a generalization of the compound gamma model proposed by Giese (2003) where correlations between the sector default rates are assumed to arise from a single risk factor. This in effect puts a uniform covariance between the sector default rates resulting in a distortion of the concentration effects in the portfolio. Researchers model the sector default rates as linear combinations of a common set of uncorrelated variables that represent macroeconomic variables or risk factors. Researchers also derive the formula for exact VaR contributions at the obligor level.

Raghavan (2003) examines the risk management in banks and found that the Risk is inherent in any walk of life in general and in financial sectors in particular. Till recently, due to regulate environment, banks could not afford to take risks. But of late, banks are exposed to same competition and hence are compelled to encounter various types of financial and non-financial risks. Risks and uncertainties form an integral part of banking which by nature entails taking risks. There are three main categories of risks; Credit Risk, Market Risk & Operational Risk. Author has discussed in detail. Main features of these risks as well as some other categories of risks such as Regulatory Risk and Environmental Risk. Various tools and techniques to manage Credit Risk, Market Risk and Operational Risk and its various components, are also discussed in detail. Another also mentioned relevant points of Basel's New Capital Accord' and role of capital adequacy, Risk Aggregation & Capital Allocation and Risk Based Supervision (RBS), in managing risks in banking sector.

Pesola (2001) found that the macroeconomic reasons for the recent banking crises in the Nordic countries are analyzed using an econometric model estimated with panel data from the 1980's and 1990's. Two alternative dependent variables are used: the ratio of banks' loan losses to lending and enterprise bankruptcies per capita. The explanatory variables are the lagged dependent variable, lagged percentage change in GDP, an income surprise variable combined with lagged aggregate indebtedness, a real interest rate surprise variable combined with lagged aggregate indebtedness and a deregulation dummy. The innovation in this paper is the use of surprise variables based on macroeconomic forecasts.

THEORETICAL DESCRIPTION

Concepts:

Credit Risk:

Credit Risk is defined as the possibility of losses associated with diminution in the credit quality of borrowers or counterparties. In a Bank's portfolio, losses stem from outright default due to inability or unwillingness of a customer or a counterparty to meet commitments in relation to lending, trading, settlement and other financial transactions. Alternatively, losses result from reduction in portfolio value arising from actual or perceived deterioration in credit quality.

Credit Risk is:

a. Risk of default: the risk that a counter party will be unable to perform as agreed.
b. Risk of loss: the risk that as a result of a counter party's inability to perform as agreed, the lender suffers a loss.
    - Accounting losses
    - Economic losses

Portfolio Risk Management

The goal of this section is to review the various techniques used to manage and measure credit risk within a portfolio and to understand the key drivers of credit risk.

Risk Management Strategy

a. Portfolio management objectives: balancing risk appetite and diversification to maximize risk adjusted returns
b. Diversification, granularity and correlation concepts
c. Focus on credit default swaps:
    - Basic structure and uses
    - Variants: index and basket products
    - Using index tranche products to understand default correlation.

Measuring Portfolio Risk

a. Portfolio credit risk vs. single credit risk.
b. Credit risk loss distributions: quantifying expected and unexpected losses.
c. Contrasting credit and market risk measurement. Key drivers of credit risk:
    - Probability of default: using rating models and rating migration
    - Default correlation: importance and issues with estimation
    - Exposure at default: estimation issues for different risk types.

TOOLS:

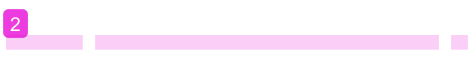
A Z-test is any statistical test for which the distribution of the test statistic under the null hypothesis can be approximated by a normal distribution. Because of the central limit theorem, many test statistics are approximately normally distributed for large samples. For each significance level, the Z-test has a single critical value (for example, 1.96 for 5% two tailed) which makes it more convenient than the Student's t-test which has separate critical values for each sample size. Therefore, many statistical tests can be conveniently performed as approximate Z-tests if the sample size is large or the population variance known.

Correlation - Correlation is computed into what is known as the correlation coefficient, which ranges between -1 and +1. Perfect positive correlation (a correlation co-efficient of +1) implies that as one security moves, either up or down, the other security will move in lockstep, in the same direction. Alternatively, perfect negative correlation means that if one security moves in either direction the security that is perfectly negatively correlated will move in the opposite direction. If the correlation is 0, the movements of the securities are said to have no correlation; they are completely random.

Key Words:

- **Portfolio** - Portfolio is a financial term denoting a collection of investments held by an investment company, hedge fund, financial institution or individual.
- **Credit Risk** - Credit risk refers to the risk that a borrower will default on any type of debt by failing to make required payments.
- **Macroeconomic Shocks** - A shock is an unexpected or unpredictable event that affects an economy, either positively or negatively.

This chapter has been based on the literature review and theoretical framework. Literature review has revealed about previous studies being conducted in the field of credit risk. So literature review helped the researcher to gain knowledge about the past studies that provide the future direction. Theoretical framework lay down the theoretical concept used in the study and helped in concluding the findings.



CHAPTER - 3

DATA PRESENTATION AND ANALYSIS

Once Data collection has been done the data needs to be presented and analyzed. This chapter deals with Data Presentation and Data Analysis using Correlation and Z-test to know the impact of macroeconomic shocks on Credit Risk of the Banks. The present chapter is divided into two parts. First part covers the presentation of data and second part of data includes the analysis of data using statistical tools.

3.1 Data Presentation

The data has been collected from the various websites for study. The sample period undertaken for study of each objective is from the year 2010 to 2014 and 2014 to 2018. Since period of 4 to 5 years usually covers a business cycle. Therefore the chosen period covers a complete business cycle i.e. both recessionary and booming phases. This would highlight whether there is an impact of macroeconomic shocks during pre-recession and post-recession period.

Date	SBI	HDFC	OBC	ICICI
31-Mar-10	2117.7330	375.9200	316.33330	925.5300
30-Jun-10	2357.9000	395.6200	354.90000	878.3000
30-Sep-10	3052.4830	460.2300	461.36670	1084.5500
31-Dec-10	2815.5000	445.2700	386.61670	1102.9330
31-Mar-11	2733.4500	446.2400	353.05000	1067.1670
30-Jun-11	2349.1330	489.9400	344.28330	1072.5000
30-Sep-11	130.3830	476.5300	297.71670	893.2667
31-Dec-11	1814.3670	453.8200	239.53330	766.4167
31-Mar-12	2133.1500	509.5833	263.23330	898.5833
30-Jun-12	2117.5670	537.2167	237.48330	855.1167
30-Sep-12	2029.3670	603.8667	253.70000	975.7667
31-Dec-12	2221.1330	672.3333	332.01670	1095.1670
31-Mar-13	2198.2500	631.0333	286.75000	1092.1670
30-Jun-13	2088.5000	512.7750	239.48330	1129.0670
30-Sep-13	1613.1670	599.0667	142.21670	866.1833
31-Dec-13	1794.1670	668.8000	198.35000	1095.8000
31-Mar-14	1658.5330	681.7500	188.11670	1092.5500
30-Jun-14	2453.5830	777.9000	304.85000	1360.5500
30-Sep-14	2447.5170	849.3667	256.55000	1488.2670
31-Dec-14	1111.6500	940.5333	309.80000	1244.3500
31-Mar-15	292.8667	1055.5670	236.80000	340.6667
30-Jun-15	270.3333	1035.9170	195.36670	318.8500
30-Sep-15	251.5833	1069.4170	146.06670	283.6167
31-Dec-15	237.3500	1085.2500	143.80000	270.8500
31-Mar-16	177.5500	1030.9000	93.46667	218.8833
30-Jun-16	204.1500	1163.5670	94.63333	240.6667
30-Sep-16	244.1000	1269.6670	122.61670	257.6167
31-Dec-16	255.3333	1219.1670	118.21670	265.7667
31-Mar-17	273.9333	1372.8170	127.98330	274.1833
30-Jun-17	283.8667	1609.2500	153.46670	298.3000
30-Sep-17	281.2167	1787.1330	131.26670	292.1833
31-Dec-17	311.9167	1844.8000	129.51670	307.2500
31-Mar-18	227.2000	1927.2000	102.55000	314.9500
30-Jun-18	258.2667	2062.9330	83.36667	281.8500
30-Sep-18	289.0833	2082.9830	75.41667	317.2000
31-Dec-18	286.8333	2050.4830	88.35000	356.7000

Table No-3.1: Table Showing Stock Prices of Selected Banks

Date	GDP	Inflation
31-Mar-10	11.2	15.31
30-Jun-10	8.5	13.65
30-Sep-10	7.6	10.31
31-Dec-10	8.2	9.16
31-Mar-11	9.2	8.98
30-Jun-11	7.5	8.91
30-Sep-11	6.5	9.16
31-Dec-11	6	8.39
31-Mar-12	5.1	7.17
30-Jun-12	5.4	10.14
30-Sep-12	5.2	9.76
31-Dec-12	4.7	10.10
31-Mar-13	4.8	11.71
30-Jun-13	6.4	10.66
30-Sep-13	6.5	10.76
31-Dec-13	5.3	10.55
31-Mar-14	8	6.89
30-Jun-14	8.7	6.86
30-Sep-14	5.9	6.76
31-Dec-14	7.1	4.98
31-Mar-15	7.6	6.58
30-Jun-15	8	5.87
30-Sep-15	7.2	4.62
31-Dec-15	9.1	6.46
31-Mar-16	9.4	5.65
30-Jun-16	8.9	6.19
30-Sep-16	7.5	5.30
31-Dec-16	7	2.72
31-Mar-17	6	2.36
30-Jun-17	6.8	1.46
30-Sep-17	7.7	2.40
31-Dec-17	8.1	3.73
31-Mar-18	8	4.74
30-Jun-18	7	3.95
30-Sep-18	6.6	5.61
31-Dec-18	7.7	5.11

Table No-3.2: Table Showing India's GDP and Inflation

3.2 Data Analysis

Correlations

Correlation of GDP with stock price

HDFC BANK-2010-2014

Correlations			
		GDP	HDFC close price
GDP	Pearson Correlation	1	-.330
	Sig. (2-tailed)		.155
	N	20	20
HDFC close price	Pearson Correlation	-.330	1
	Sig. (2-tailed)	.155	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .155 is greater than .05. And r(18) = -.330

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a negative and weak relationship between GDP and Stocks, Pearson's r(18) = -.330 This means that changes in GDP is not correlated with Stock prices.

Correlation of GDP with stock price

HDFC BANK-2014-2018

Correlations			
		GDP	HDFC close price
GDP	Pearson Correlation	1	-.214
	Sig. (2-tailed)		.366
	N	20	20
HDFC close price	Pearson Correlation	-.214	1
	Sig. (2-tailed)	.366	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .366 is greater than .05. And r(18) = -.214

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a positive and weak relationship between GDP and Stocks, Pearson's r(18) = -.214 This means that changes in GDP is not correlated with Stock prices.

Correlation of GDP with stock price

ICICI BANK-2010-2014

Correlations			
		GDP	ICICIclose price
GDP	Pearson Correlation	1	.056
	Sig. (2-tailed)		.814
	N	20	20
ICICI close price	Pearson Correlation	.056	1
	Sig. (2-tailed)	.814	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .814 is greater than .05. And r(18) = .056

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a positive and weak relationship between GDP and Stocks, Pearson's r(18) = .056. This means that changes in GDP is not correlated with Stock prices.

Correlation of GDP with stock price

ICICI BANK-2014-2018

Correlations			
		GDP	ICICIclose price
GDP	Pearson Correlation	1	-.163
	Sig. (2-tailed)		.492
	N	20	20
ICICIclose price	Pearson Correlation	-.163	1
	Sig. (2-tailed)	.492	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .492 is greater than .05. And r(18) = -.163

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a negative and weak relationship between GDP and Stocks, Pearson's r(18) = -.163 This means that changes in GDP is not correlated with Stock prices.

Correlation of GDP with stock price

OBC BANK-2010-2014

Correlations			
		GDP	OBC close price
GDP	Pearson Correlation	1	.400
	Sig. (2-tailed)		.080
	N	20	20
OBC close price	Pearson Correlation	.400	1
	Sig. (2-tailed)	.080	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .080 is greater than .05. And r(18) = .400

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a positive and weak relationship between GDP and Stocks, Pearson's r(18) = .400 This means that changes in GDP is not correlated with Stock prices.

Correlation of GDP with stock price

OBC BANK-2014-2018

Correlations			
		GDP	OBC close price
GDP	Pearson Correlation	1	-.084
	Sig. (2-tailed)		.725
	N	20	20
OBC close price	Pearson Correlation	-.084	1
	Sig. (2-tailed)	.725	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .725 is greater than .05. And r(18) = -.084

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a negative and weak relationship between GDP and Stocks, Pearson's r(18) = -.084 This means that changes in GDP is not correlated with Stock prices.

Correlation of GDP with stock price

SBI BANK-2010-2014

Correlations			
		GDP	SBI close price
GDP	Pearson Correlation	1	.222
	Sig. (2-tailed)		.348
	N	20	20
SBI close price	Pearson Correlation	.222	1
	Sig. (2-tailed)	.348	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .348 is greater than .05. And r(18) = .222

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a positive and weak relationship between GDP and Stocks, Pearson's r(18) = .222 This means that changes in GDP is not correlated with Stock prices.

Correlation of GDP with stock price

SBI BANK-2014-2018

Correlations			
		GDP	SBI close price
GDP	Pearson Correlation	1	-.118
	Sig. (2-tailed)		.620
	N	20	20
SBI close price	Pearson Correlation	-.118	1
	Sig. (2-tailed)	.620	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .620 is greater than .05. And r(18) = -.118

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a negative and weak relationship between GDP and Stocks, Pearson's r(18) = -.118 This means that changes in GDP is not correlated with Stock prices.

Correlation of Inflation with stock price

HDFC BANK-2010-2014

Correlations			
		inflation	HDFC close price
Inflation	Pearson Correlation	1	-.644**
	Sig. (2-tailed)		.002
	N	20	20
HDFC close price	Pearson Correlation	-.644**	1
	Sig. (2-tailed)	.002	
	N	20	20
**. Correlation is significant at the 0.01 level (2-tailed).			

Analysis

The above table depicts that the sig. (2 tailed) value .002 is less than .05. And r(18) = - .644.

Interpretation

This concludes that there is a statistically significant correlation between Inflation and Stocks. This means, increases or decreases in Inflation do significantly relate to increases or decreases in stock prices.

There is a negative but strong relationship between Inflation and Stocks, Pearson's r(18) = -.644. This means that changes in Inflation is strongly correlated with Stock prices. The negative correlation depicts that if Inflation increases, Stock prices will decrease and vice-versa.

Correlation of Inflation with stock price

HDFC BANK-2014-2018

Correlations			
		inflation	HDFC close price
inflation	Pearson Correlation	1	-.515*
	Sig. (2-tailed)		.020
	N	20	20
HDFC close price	Pearson Correlation	-.515*	1
	Sig. (2-tailed)	.020	
	N	20	20
*. Correlation is significant at the 0.05 level (2-tailed).			

Analysis

The above table depicts that the sig. (2 tailed) value .020 is less than .05. And r(18) = - .515

Interpretation

This concludes that there is a statistically significant correlation between Inflation and Stocks. This means, increases or decreases in Inflation do significantly relate to increases or decreases in stock prices.

There is a negative but strong relationship between Inflation and Stocks, Pearson's r(18) = -.515. This means that changes in Inflation is strongly correlated with Stock prices. The negative correlation depicts that if Inflation increases, Stock prices will decrease and vice-versa.

Correlation of Inflation with stock price

ICICI BANK-2010-2014

Correlations			
		inflation	ICICIclose price
inflation	Pearson Correlation	1	-.475*
	Sig. (2-tailed)		.034
	N	20	20
ICICIclose price	Pearson Correlation	-.475*	1
	Sig. (2-tailed)	.034	
	N	20	20
*. Correlation is significant at the 0.05 level (2-tailed).			

Analysis

The above table depicts that the sig. (2 tailed) value .034 is less than .05. And r(18) = - .475.

Interpretation

This concludes that there is a statistically significant correlation between Inflation and Stocks. This means, increases or decreases in Inflation do significantly relate to increases or decreases in stock prices.

There is a negative but strong relationship between Inflation and Stocks, Pearson's r(18) = -.475. This means that changes in Inflation is strongly correlated with Stock prices. The negative correlation depicts that if Inflation increases, Stock prices will decrease and vice-versa.

Correlation of Inflation with stock price

ICICI BANK-2014-2018

Correlations			
		inflation	ICICIclose price
inflation	Pearson Correlation	1	.453*
	Sig. (2-tailed)		.045
	N	20	20
ICICIclose price	Pearson Correlation	.453*	1
	Sig. (2-tailed)	.045	
	N	20	20
*. Correlation is significant at the 0.05 level (2-tailed).			

Analysis

The above table depicts that the sig. (2 tailed) value .045 is less than .05. And r(18) = .453.

Interpretation

This concludes that there is a statistically significant correlation between Inflation and Stocks. This means, increases or decreases in Inflation do significantly relate to increases or decreases in stock prices.

There is a positive but strong relationship between Inflation and Stocks, Pearson's r(18) = .453. This means that changes in Inflation is strongly correlated with Stock prices. The negative correlation depicts that if Inflation increases, Stock prices will decrease and vice-versa.

Correlation of Inflation with stock price

OBC BANK-2010-2014:

Correlations			
		inflation	OBC close price
inflation	Pearson Correlation	1	.130
	Sig. (2-tailed)		.585
	N	20	20
OBC close price	Pearson Correlation	.130	1
	Sig. (2-tailed)	.585	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .585 is greater than .05. And r(18) = .130

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a positive and weak relationship between GDP and Stocks, Pearson's r(18) = .130 This means that changes in GDP is not correlated with Stock prices.

Correlation of Inflation with stock price

OBC BANK-2014-2018

Correlations			
		inflation	OBC close price
Inflation	Pearson Correlation	1	.372
	Sig. (2-tailed)		.107
	N	20	20
OBC close price	Pearson Correlation	.372	1
	Sig. (2-tailed)	.107	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .107 is greater than .05. And r(18) = .372

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a positive and weak relationship between GDP and Stocks, Pearson's r(18) = .372 This means that changes in GDP is not correlated with Stock prices.

Correlation of Inflation with stock price

SBI BANK-2010-2014

Correlations			
		SBI close price	inflation
SBI close price	Pearson Correlation	1	.179
	Sig. (2-tailed)		.450
	N	20	20
inflation	Pearson Correlation	.179	1
	Sig. (2-tailed)	.450	
	N	20	20

Analysis

The above table depicts that the sig. (2 tailed) value .450 is greater than .05. And r(18) = .179

Interpretation

This concludes that there is no statistically significant correlation between GDP and Stocks. This means, increases or decreases in GDP do not significantly relate to increases or decreases in stock prices.

There is a positive and weak relationship between GDP and Stocks, Pearson's r(18) = .179 This means that changes in GDP is not correlated with Stock prices.

Correlation of Inflation with stock price

SBI BANK-2014-2018

Correlations			
		inflation	SBI close price
inflation	Pearson Correlation	1	.473*
	Sig. (2-tailed)		.035
	N	20	20
SBI close price	Pearson Correlation	.473*	1
	Sig. (2-tailed)	.035	
	N	20	20
*. Correlation is significant at the 0.05 level (2-tailed).			

Analysis

The above table depicts that the sig. (2 tailed) value .035 is less than .05. And r(18) = .473.

Interpretation

This concludes that there is a statistically significant correlation between Inflation and Stocks. This means, increases or decreases in Inflation do significantly relate to increases or decreases in stock prices.

There is a positive but strong relationship between Inflation and Stocks, Pearson's r(18) = .473. This means that changes in Inflation is strongly correlated with Stock prices. The negative correlation depicts that if Inflation increases, Stock prices will decrease and vice-versa.

Z – TEST – Inflation and Risk

Inflation vs risk

HDFC

2010-2014

Inflation	RISK	Zinflation	ZRISK
15.31	0.002997	2.40354	-0.68667
13.65	0.008785	1.71557	-0.44450
10.31	0.000330	0.33134	-0.79826
9.16	0.074229	-0.14526	2.29371
8.98	0.000072	-0.21986	-0.80905
8.91	0.003861	-0.24887	-0.65052
9.16	0.001035	-0.14526	-0.76876
8.39	0.002963	-0.46438	-0.68809
7.17	0.000417	-0.96999	-0.79462
10.14	0.003972	0.26089	-0.64588
9.76	0.016467	0.10340	-0.12308
10.10	0.012595	0.24431	-0.28509
11.71	0.029311	0.91156	0.41432
10.66	0.018796	0.47640	-0.02563
10.76	0.024501	0.51784	0.21307
10.55	0.013088	0.43081	-0.26446
6.89	0.041078	-1.08604	0.90665
6.86	0.065988	-1.09847	1.94890
6.76	0.002191	-1.13991	-0.72039
4.98	0.065497	-1.87761	1.92836

Descriptive Statistics

	N	Mean	Std. Deviation
inflation	20	9.5105	2.41290
RISK	20	.01940865	.023900344
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation = 9.5105, Risk = 0.01940865;

Std. Deviation: Inflation = 2.41290, Risk = 0.23900344.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = 9.5105, the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 2.40354 it mean the score is very far away from the mean.

Similarly, Risk Mean = 0.01940865 , the z-scores are negative mostly which means that the Risk is less than average. It is also observed that z-score is 2.29371 far away from the mean.

2014-2018

inflation	RISK	Zinflation	ZRISK
6.89	0.0343630	1.19496	1.27868
6.86	0.0573930	1.17684	2.58005
6.76	0.0008700	1.11642	-0.61393
4.98	0.0569290	0.04108	2.55383
6.58	0.0000190	1.00768	-0.66201
5.87	0.0204305	0.57875	0.49139
4.62	0.0005560	-0.17640	-0.63167
6.46	0.0009060	0.93519	-0.61189
5.65	0.0036580	0.44584	-0.45638
6.19	0.0000510	0.77207	-0.66021
5.30	0.0139370	0.23440	0.12446
2.72	0.0060480	-1.32424	-0.32133
2.36	0.0018550	-1.54173	-0.55827
1.46	0.0027740	-2.08544	-0.50634
2.40	0.0052740	-1.51756	-0.36507
3.73	0.0086360	-0.71408	-0.17509
4.74	0.0131940	-0.10391	0.08247
3.95	0.0000170	-0.58117	-0.66213
5.61	0.0057960	0.42168	-0.33557
5.11	0.0019840	0.11962	-0.55098

Descriptive Statistics

	N	Mean	Std. Deviation
inflation	20	4.9120	1.65529
RISK	20	.011734525	.0176967728
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation =4.9120, Risk = .011734525;

Std. Deviation: Inflation = 1.65529, Risk = .0176967728.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = 4.9120, the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 1.19496 it mean the score is very far away from the mean.

Similarly, Risk Mean = .011734525, the z-scores are negative mostly which means that the Risk is less than average.

ICICI

2010-2014

Inflation	RISK	Zinflation	ZRISK
15.31	0.000211	2.40354	-1.04413
13.65	0.037453	1.71557	0.17034
10.31	0.013640	0.33134	-0.60621
9.16	0.047804	-0.14526	0.50788
8.98	0.000506	-0.21986	-1.03451
8.91	0.024906	-0.24887	-0.23882
9.16	0.018215	-0.14526	-0.45702
8.39	0.003595	-0.46438	-0.93378
7.17	0.000003	-0.96999	-1.05092
10.14	0.024249	0.26089	-0.26025
9.76	0.077504	0.10340	1.47641
10.10	0.072430	0.24431	1.31094
11.71	0.008614	0.91156	-0.77011
10.66	0.004146	0.47640	-0.91581
10.76	0.011824	0.51784	-0.66543
10.55	0.005942	0.43081	-0.85724
6.89	0.071255	-1.08604	1.27263
6.86	0.080614	-1.09847	1.57783
6.76	0.064427	-1.13991	1.04996
4.98	0.077254	-1.87761	1.46826

Descriptive Statistics

	N	Mean	Std. Deviation
Inflation	20	9.5105	.03222960
RISK	20	.03222960	.03222960
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation = .03222960, Risk = .03222960;

Std. Deviation: Inflation = .03222960, Risk = .03222960.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = .03222960, the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 2.40354it mean the score is very far away from the mean.

Similarly, Risk Mean = .03222960, the z-scores are negative mostly which means that the Risk is less than average.

2014-2018

Inflation	RISK	Zinflation	ZRISK
6.89	0.065239	1.19496	-0.02499
6.86	0.074206	1.17684	0.02285
6.76	0.058713	1.11642	-0.05981
4.98	0.070984	0.04108	0.00566
6.58	0.007459	1.00768	-0.33329
5.87	0.856344	0.57875	4.19604
4.62	0.006318	-0.17640	-0.33937
6.46	0.000773	0.93519	-0.36896
5.65	0.092993	0.44584	0.12309
6.19	0.005555	0.77207	-0.34344
5.30	0.044662	0.23440	-0.13478
2.72	0.000043	-1.32424	-0.37285
2.36	0.003127	-1.54173	-0.35640
1.46	0.000342	-2.08544	-0.37126
2.40	0.036333	-1.51756	-0.17922
3.73	0.027391	-0.71408	-0.22694
4.74	0.020051	-0.10391	-0.26610
3.95	0.001328	-0.58117	-0.36600
5.61	0.013295	0.42168	-0.30215
5.11	0.013307	0.11962	-0.30208

Descriptive Statistics

	N	Mean	Std. Deviation
Inflation	20	4.9120	1.65529
RISK	20	.06992315	.187419597
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation = 4.9120, Risk = .06992315;

Std. Deviation: Inflation = 1.65529, Risk = .187419597.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = 4.9120 , the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 1.19496 it mean the score is very far away from the mean

Similarly, Risk Mean = .06992315, the z-scores are negative mostly which means that the Risk is less than average.

OBC

2010-2014

Inflation	RISK	Zinflation	ZRISK
15.31	0.068769	2.40354	1.00628
13.65	0.044450	1.71557	0.35332
10.31	0.000366	0.33134	-0.83033
9.16	0.120254	-0.14526	2.38864
8.98	0.002600	-0.21986	-0.77035
8.91	0.013002	-0.24887	-0.49105
9.16	0.000173	-0.14526	-0.83551
8.39	0.000037	-0.46438	-0.83916
7.17	0.005038	-0.96999	-0.70489
10.14	0.045851	0.26089	0.39094
9.76	0.103386	0.10340	1.93574
10.10	0.001346	0.24431	-0.80401
11.71	0.030860	0.91156	-0.01157
10.66	0.049330	0.47640	0.48435
10.76	0.000019	0.51784	-0.83964
10.55	0.026427	0.43081	-0.13059
6.89	0.028813	-1.08604	-0.06653
6.86	0.082830	-1.09847	1.38382
6.76	0.001160	-1.13991	-0.80901
4.98	0.001107	-1.87761	-0.81043

Descriptive Statistics

	N	Mean	Std. Deviation
Inflation	20	9.5105	2.41290
RISK	20	.03129090	.037244207
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation = 9.5105, Risk = .03129090;

Std. Deviation: Inflation = 2.41290, Risk = .037244207.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = 9.5105, the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 2.40354 it mean the score is very far away from the mean.

Similarly, Risk Mean = .03129090, the z-scores are negative mostly which means that the Risk is less than average.

2014-2018

Inflation	RISK	Zinflation	ZRISK
6.89	0.044375	1.19496	0.07411
6.86	0.108052	1.17684	1.30599
6.76	0.005621	1.11642	-0.67562
4.98	0.000058	0.04108	-0.78324
6.58	0.054178	1.00768	0.26375
5.87	0.228065	0.57875	3.62773
4.62	0.040752	-0.17640	0.00402
6.46	0.024959	0.93519	-0.30151
5.65	0.028134	0.44584	-0.24009
6.19	0.008001	0.77207	-0.62958
5.30	0.071567	0.23440	0.60016
2.72	0.037826	-1.32424	-0.05259
2.36	0.014231	-1.54173	-0.50905
1.46	0.003284	-2.08544	-0.72083
2.40	0.028133	-1.51756	-0.24011
3.73	0.051940	-0.71408	0.22046
4.74	0.001035	-0.10391	-0.76434
3.95	0.008274	-0.58117	-0.62429
5.61	0.016656	0.42168	-0.46214
5.11	0.035746	0.11962	-0.09283

Descriptive Statistics

	N	Mean	Std. Deviation
Inflation	20	4.9120	1.65529
RISK	20	.04054435	.051690938
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation = 4.9120, Risk = .04054435;

Std. Deviation: Inflation = 1.65529, Risk = .051690938.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = 4.9120, the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 1.19496 it mean the score is very far away from the mean.

Similarly, Risk Mean = .04054435 , the z-scores are negative mostly which means that the Risk is less than average.

SBI

2010-2014

Inflation	RISK	Zinflation	ZRISK
15.31	0.006218	2.40354	-0.79243
13.65	0.110413	1.71557	1.70442
10.31	0.002208	0.33134	-0.88852
9.16	0.078968	-0.14526	0.95090
8.98	0.000076	-0.21986	-0.93961
8.91	0.001533	-0.24887	-0.90470
9.16	0.017761	-0.14526	-0.51582
8.39	0.000277	-0.46438	-0.93480
7.17	0.001374	-0.96999	-0.90851
10.14	0.041248	0.26089	0.04700
9.76	0.051346	0.10340	0.28899
10.10	0.022384	0.24431	-0.40504
11.71	0.046164	0.91156	0.16481
10.66	0.138896	0.47640	2.38697
10.76	0.034010	0.51784	-0.12644
10.55	0.032149	0.43081	-0.17104
6.89	0.052000	-1.08604	0.30466
6.86	0.114258	-1.09847	1.79656
6.76	0.003787	-1.13991	-0.85068
4.98	0.030660	-1.87761	-0.20672

Descriptive Statistics

	N	Mean	Std. Deviation
Inflation	20	9.5105	2.41290
RISK	20	.03928650	.041730513
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation = 9.5105, Risk = 0.01940865;

Std. Deviation: Inflation = 2.41290, Risk = 0.23900344.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = 9.5105, the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 2.40354 it mean the score is very far away from the mean.

Similarly, Risk Mean = 0.01940865 , the z-scores are negative mostly which means that the Risk is less than average.

2014-2018

Inflation	RISK	Zinflation	ZRISK
6.89	0.034082	1.19496	-0.02619
6.86	0.086788	1.17684	0.65423
6.76	0.000328	1.11642	-0.46195
4.98	0.017339	0.04108	-0.24234
6.58	0.004030	1.00768	-0.41416
5.87	0.348885	0.57875	4.03786
4.62	0.012254	-0.17640	-0.30799
6.46	0.002734	0.93519	-0.43089
5.65	0.002618	0.44584	-0.43239
6.19	0.008934	0.77207	-0.35085
5.30	0.076005	0.23440	0.51503
2.72	0.009317	-1.32424	-0.34590
2.36	0.002307	-1.54173	-0.43640
1.46	0.025435	-2.08544	-0.13782
2.40	0.038866	-1.51756	0.03557
3.73	0.006239	-0.71408	-0.38564
4.74	0.029577	-0.10391	-0.08435
3.95	0.003515	-0.58117	-0.42081
5.61	0.000577	0.42168	-0.45874
5.11	0.012387	0.11962	-0.30627

Descriptive Statistics

	N	Mean	Std. Deviation
Inflation	20	4.9120	1.65529
RISK	20	.03611085	.077460398
Zscore(inflation)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: Inflation = 4.9120, Risk = .03611085;

Std. Deviation: Inflation = 1.65529, Risk = .077460398.

Interpretation

The above table depicts the z scores of the variables Inflation and Risk from the raw data in the left column. Here Inflation Mean = 4.9120, the z-score will depict if it's above or below than average. It is seen that the z-scores (Inflation) are positive as well negative which means that Inflation is fluctuating from average. Where z-score is 1.19496 it mean the score is very far away from the mean.

Similarly, Risk Mean = .03611085, the z-scores are negative mostly which means that the Risk is less than average.

Z – TEST – GDP and Risk

Hdfc

GDP	RISK	ZGDP	ZRISK
11.2	0.002997	2.51189	-0.68667
8.5	0.008785	0.93832	-0.44450
7.6	0.000330	0.41379	-0.79826
8.2	0.074229	0.76347	2.29371
9.2	0.000072	1.34628	-0.80905
7.5	0.003861	0.35551	-0.65052
6.5	0.001035	-0.22729	-0.76876
6.0	0.002963	-0.51870	-0.68809
5.1	0.000417	-1.04322	-0.79462
5.4	0.003972	-0.86838	-0.64588
5.2	0.016467	-0.98494	-0.12308
4.7	0.012595	-1.27634	-0.28509
4.8	0.029311	-1.21806	0.41432
6.4	0.018796	-0.28557	-0.02563
6.5	0.024501	-0.22729	0.21307
5.3	0.013088	-0.92666	-0.26446
8.0	0.041078	0.64691	0.90665
8.7	0.065988	1.05488	1.94890
5.9	0.002191	-0.57698	-0.72039
7.1	0.065497	0.12239	1.92836

2010-2014

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	6.890	1.7158
RISK	20	.01940865	.023900344
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 6.890, Risk = .01940865;

Std. Deviation: GDP = 1.7158 , Risk = .023900344.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here GDP Mean = 6.890, the z-score will depict if it's above or below than average. It is seen that the z-scores (GDP) are positive as well negative which means that GDP is fluctuating from average. Where z-score is 2.51189 it mean the score is very far away from the mean.

Similarly, Risk Mean = .01940865, the z-scores are negative mostly which means that the Risk is less than average.

2014-2018

GDP	RISK	ZGDP	ZRISK
8.0	0.034363	0.40271	0.28827
8.7	0.057393	1.13491	0.78243
5.9	0.000870	-1.79390	-0.43039
7.1	0.056929	-0.53869	0.77247
7.6	0.000019	-0.01569	-0.44865
8.0	0.204305	0.40271	3.93474
7.2	0.000556	-0.43409	-0.43713
9.1	0.000906	1.55332	-0.42962
9.4	0.003658	1.86712	-0.37057
8.9	0.000051	1.34411	-0.44797
7.5	0.013937	-0.12029	-0.15001
7.0	0.006048	-0.64329	-0.31929
6.0	0.001855	-1.68930	-0.40926
6.8	0.002774	-0.85249	-0.38954
7.7	0.005274	0.08891	-0.33590
8.1	0.008636	0.50731	-0.26376
8.0	0.013194	0.40271	-0.16595
7.0	0.000017	-0.64329	-0.44870
6.6	0.005796	-1.06169	-0.32470
7.7	0.001984	0.08891	-0.40649

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	7.615	.9560
RISK	20	.02092825	.046604504
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 7.615, Risk = .02092825;

Std. Deviation: Inflation = 2.41290, Risk = 0.23900344.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here GDP Mean = 9.5105, the z-score will depict if it's above or below than average. It is seen that the z-scores (GDP) are positive as well negative which means that GDP is fluctuating from average. Where z-score is 0.40271 it mean the score is very far away from the mean.

Similarly, Risk Mean = 0.01940865 , the z-scores are negative mostly which means that the Risk is less than average.

ICICI

2010-2014

GDP	RISK	ZGDP	ZRISK
11.2	0.000211	2.51189	-1.04413
8.5	0.037453	0.93832	0.17034
7.6	0.013640	0.41379	-0.60621
8.2	0.047804	0.76347	0.50788
9.2	0.000506	1.34628	-1.03451
7.5	0.024906	0.35551	-0.23882
6.5	0.018215	-0.22729	-0.45702
6.0	0.003595	-0.51870	-0.93378
5.1	0.000003	-1.04322	-1.05092
5.4	0.024249	-0.86838	-0.26025
5.2	0.077504	-0.98494	1.47641
4.7	0.072430	-1.27634	1.31094
4.8	0.008614	-1.21806	-0.77011
6.4	0.004146	-0.28557	-0.91581
6.5	0.011824	-0.22729	-0.66543
5.3	0.005942	-0.92666	-0.85724
8.0	0.071255	0.64691	1.27263
8.7	0.080614	1.05488	1.57783
5.9	0.064427	-0.57698	1.04996
7.1	0.077254	0.12239	1.46826

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	6.890	1.7158
RISK	20	.03222960	.030665239
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 6.890, Risk = .03222960; Std. Deviation: GDP = 1.7158, Risk = .030665239.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here, GDP Mean = 6.890; the z-score will depict if it's above or below than average. It is seen that most of the z-scores (GDP) are positive which means that GDP is better than average. With an exception where z-score is -0.22729 which means the score is very far away from the mean.

Similarly, Risk Mean = .03222960, the z-scores are negative mostly which means that the Risk is less than average.

2014-2018

GDP	RISK	ZGDP	ZRISK
8.0	0.065239	0.40271	-0.02499
8.7	0.074206	1.13491	0.02285
5.9	0.058713	-1.79390	-0.05981
7.1	0.070984	-0.53869	0.00566
7.6	0.007459	-0.01569	-0.33329
8.0	0.856344	0.40271	4.19604
7.2	0.006318	-0.43409	-0.33937
9.1	0.000773	1.55332	-0.36896
9.4	0.092993	1.86712	0.12309
8.9	0.005555	1.34411	-0.34344
7.5	0.044662	-0.12029	-0.13478
7.0	0.000043	-0.64329	-0.37285
6.0	0.003127	-1.68930	-0.35640
6.8	0.000342	-0.85249	-0.37126
7.7	0.036333	0.08891	-0.17922
8.1	0.027391	0.50731	-0.22694
8.0	0.020051	0.40271	-0.26610
7.0	0.001328	-0.64329	-0.36600
6.6	0.013295	-1.06169	-0.30215
7.7	0.013307	0.08891	-0.30208

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	7.615	.9560
RISK	20	.06992315	.187419597
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 7.615, Risk = .06992315; Std. Deviation: GDP = .9560, Risk = .187419597.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here, GDP Mean = 7.615; the z-score will depict if it's above or below than average. It is seen that most of the z-scores (GDP) are positive which means that GDP is better than average. With an exception where z-score is 0.40271 which means the score is very far away from the mean.

Similarly, Risk Mean = .06992315, the z-scores are negative mostly which means that the Risk is less than average.

Obc

2010-2014

GDP	RISK	ZGDP	ZRISK
11.2	0.068769	2.51189	1.00628
8.5	0.044450	0.93832	0.35332
7.6	0.000366	0.41379	-0.83033
8.2	0.120254	0.76347	2.38864
9.2	0.002600	1.34628	-0.77035
7.5	0.013002	0.35551	-0.49105
6.5	0.000173	-0.22729	-0.83551
6.0	0.000037	-0.51870	-0.83916
5.1	0.005038	-1.04322	-0.70489
5.4	0.045851	-0.86838	0.39094
5.2	0.103386	-0.98494	1.93574
4.7	0.001346	-1.27634	-0.80401
4.8	0.030860	-1.21806	-0.01157
6.4	0.049330	-0.28557	0.48435
6.5	0.000019	-0.22729	-0.83964
5.3	0.026427	-0.92666	-0.13059
8.0	0.028813	0.64691	-0.06653
8.7	0.082830	1.05488	1.38382
5.9	0.001160	-0.57698	-0.80901
7.1	0.001107	0.12239	-0.81043

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	6.890	1.7158
RISK	20	.03129090	.037244207
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 6.890, Risk = .03129090; Std. Deviation: GDP = 1.7158, Risk = .037244207.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here, GDP Mean = 6.890; the z-score will depict if it's above or below than average. It is seen that most of the z-scores (GDP) are positive which means that GDP is better than average. With an exception where z-score is 2.51189 which means the score is very far away from the mean.

Similarly, Risk Mean = .03129090 , the z-scores are negative mostly which means that the Risk is less than average.

2014-2018

GDP	RISK	ZGDP	ZRISK
8.0	0.044375	0.40271	0.07411
8.7	0.108052	1.13491	1.30599
5.9	0.005621	-1.79390	-0.67562
7.1	0.000058	-0.53869	-0.78324
7.6	0.054178	-0.01569	0.26375
8.0	0.228065	0.40271	3.62773
7.2	0.040752	-0.43409	0.00402
9.1	0.024959	1.55332	-0.30151
9.4	0.028134	1.86712	-0.24009
8.9	0.008001	1.34411	-0.62958
7.5	0.071567	-0.12029	0.60016
7.0	0.037826	-0.64329	-0.05259
6.0	0.014231	-1.68930	-0.50905
6.8	0.003284	-0.85249	-0.72083
7.7	0.028133	0.08891	-0.24011
8.1	0.051940	0.50731	0.22046
8.0	0.001035	0.40271	-0.76434
7.0	0.008274	-0.64329	-0.62429
6.6	0.016656	-1.06169	-0.46214
7.7	0.035746	0.08891	-0.09283

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	7.615	.9560
RISK	20	.04054435	.051690938
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 7.615, Risk = .04054435; Std. Deviation: GDP = .9560, Risk = .051690938.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here, GDP Mean = 7.615; the z-score will depict if it's above or below than average. It is seen that most of the z-scores (GDP) are positive which means that GDP is better than average. With an exception where z-score is 0.40271 which means the score is very far away from the mean.

Similarly, Risk Mean = .04054435, the z-scores are negative mostly which means that the Risk is less than average.

SBI

2010-2014

GDP	RISK	ZGDP	ZRISK
11.2	0.006218	2.51189	-0.79243
8.5	0.110413	0.93832	1.70442
7.6	0.002208	0.41379	-0.88852
8.2	0.078968	0.76347	0.95090
9.2	0.000076	1.34628	-0.93961
7.5	0.001533	0.35551	-0.90470
6.5	0.017761	-0.22729	-0.51582
6.0	0.000277	-0.51870	-0.93480
5.1	0.001374	-1.04322	-0.90851
5.4	0.041248	-0.86838	0.04700
5.2	0.051346	-0.98494	0.28899
4.7	0.022384	-1.27634	-0.40504
4.8	0.046164	-1.21806	0.16481
6.4	0.138896	-0.28557	2.38697
6.5	0.034010	-0.22729	-0.12644
5.3	0.032149	-0.92666	-0.17104
8.0	0.052000	0.64691	0.30466
8.7	0.114258	1.05488	1.79656
5.9	0.003787	-0.57698	-0.85068
7.1	0.030660	0.12239	-0.20672

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	6.890	1.7158
RISK	20	.03928650	.041730513
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 6.890, Risk = .03928650; Std. Deviation: GDP = 1.7158, Risk = .041730513.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here, GDP Mean = 6.890; the z-score will depict if it's above or below than average. It is seen that most of the z-scores (GDP) are positive which means that GDP is better than average. With an exception where z-score is 2.51189 which means the score is very far away from the mean.

Similarly, Risk Mean = .03928650, the z-scores are negative mostly which means that the Risk is less than average.

2014-2018

GDP	RISK	ZGDP	ZRISK
8.0	0.034082	0.40271	-0.02619
8.7	0.086788	1.13491	0.65423
5.9	0.000328	-1.79390	-0.46195
7.1	0.017339	-0.53869	-0.24234
7.6	0.004030	-0.01569	-0.41416
8.0	0.348885	0.40271	4.03786
7.2	0.012254	-0.43409	-0.30799
9.1	0.002734	1.55332	-0.43089
9.4	0.002618	1.86712	-0.43239
8.9	0.008934	1.34411	-0.35085
7.5	0.076005	-0.12029	0.51503
7.0	0.009317	-0.64329	-0.34590
6.0	0.002307	-1.68930	-0.43640
6.8	0.025435	-0.85249	-0.13782
7.7	0.038866	0.08891	0.03557
8.1	0.006239	0.50731	-0.38564
8.0	0.029577	0.40271	-0.08435
7.0	0.003515	-0.64329	-0.42081
6.6	0.000577	-1.06169	-0.45874
7.7	0.012387	0.08891	-0.30627

Descriptive Statistics

	N	Mean	Std. Deviation
GDP	20	7.615	.9560
RISK	20	.03611085	.077460398
Zscore(GDP)	20	.0000000	1.00000000
Zscore(RISK)	20	.0000000	1.00000000
Valid N (listwise)	20		

Analysis

The above table depicts that the Mean: GDP = 7.615, Risk = .03611085

Std. Deviation: GDP = .9560, Risk = .077460398.

Interpretation

The above table depicts the z scores of the variables GDP and Risk from the raw data in the left column. Here, GDP Mean 7.615; the z-score will depict if it's above or below than average. It is seen that most of the z-scores (GDP) are positive which means that GDP is better than average. With an exception where z-score is 0.40271 which means the score is very far away from the mean.

Similarly, Risk Mean = .03611085, the z-scores are negative mostly which means that the Risk is less than average.

CHAPTER – 4

SUMMARY & CONCLUSION

The present chapter aims to recollect the various phases of the study. A summary of the research with the main findings has also been presented. Revisiting of objectives is essential to understand whether the purpose and aim of research has been achieved. Limitations of the study have been pointed out. Recommendations based on the study have also been presented. Finally, the chapter throws light on directions for future research.

4.1 Findings/Results of the Study

a. It is found that Private Banks and Public Banks both have very little correlation with macroeconomic shocks.

b. Private and Public banks displays a weak relationship with macroeconomic shocks.

c. It is found that both Private and Public Banks display a little correlation in the pre-recession period.

d. It is found that Private Banks displays a positive and strong correlation with macroeconomic shocks in pre-recession period.

e. It is found that Public bank namely OBC display a negative correlation with macroeconomic shocks in pre-recession period.

f. No correlation is found between Private and Public Banks and macroeconomic shocks post-recession period.

g. It is found that there is no relationship between macroeconomic shocks and default

probabilities of the banks.

h. It is found that there is no impact of macroeconomic shocks on credit risk profile of the banks.

i. It is found that the credit risk of the banks is negative, which means that the risk is less than the average.

j. It is found that the macroeconomic shocks are positive, which means that macroeconomic shocks are better than the average.

4.2 Limitations

Every attempt had been taken to obtain the error free and meaningful result. However, as nothing in this world is 100% perfect, there were still the chances for error on account of following limitations:

a. The study being secondary in nature deals with historic data and does not take into account the current scenario.

b. The macroeconomic shocks considered are GDP and Inflation only; hence it limits study only to these two variables.

c. The study limits to historic data and today's environment being dynamic in nature; so it does not provide a recent picture of the study.

d. Since the research is restricted only within few sample banks, the same result may not be generalized for the whole industry.

4.3 Suggestions & Scope for Further Study

The research work offers prospects for future researchers in Finance specifically in the area of 'Credit Risk'. The research has focused on few variables and it can be further extended with considering other macroeconomic variables. The research has further future scope because of the dynamic environment and constant changing probability of defaults in banking sector.

The research covers only few banks sample and further research can be pursued with larger sample size and other macroeconomic shocks. The research is continuous in nature and can be extended further in future. It is helpful for researchers taking up research in the area of Portfolio Risk in relation to banking industry.

The research is helpful in banks for future references as it involves portfolio credit risk of the banks. And also a thorough research has been in the research based on historic data; this can be useful in banks for trend analysis.

The chapter has attempted to summarize and present the findings of this research work. The study has tried to identify the impact of macroeconomic shocks on the credit risk profile of the banks. The study has shown that GDP, Inflation and Stock Prices have very little correlation. And GDP and Inflation does not have an impact on the Credit Risk of the Banks. Some of the limitations have also been analyzed like data was collected for only limited time period and suggestions have been given by the researcher for the future studies in the same area so that future research can cover the much broad area.

CHAPTER – 5

RECOMMENDATIONS

Recommendations are being regarded as a key measure of determining what all can be done with the findings and how all these limitations can be removed. This chapter covers the recommendations by the researcher to the investors which they should keep in mind before making investment.

5.1 Recommendations

a. Banks should analyze their Credit Risk using proper and correct technique in relation to the macroeconomic variables. And should also consider Credit Risk Models for analyzing the risk.

b. The analysis should be done keeping in consideration all the macroeconomic shocks. It would be beneficial for the banks in understanding the current situation.

c. The default probabilities of the banks should be analyzed in relating to the macroeconomic shocks.

d. The analysis should be done considering the whole banking industry not with a sample of few. This would provide a clear understanding to the study.

The chapter discussed certain suggestions on the basis of the researcher's findings. Banks should analyze their Credit Risk using proper and required techniques in relation to the macroeconomic shocks. The study should be conducted considering all the macroeconomic shocks.

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