

EFFECTS OF CREDIT RISK PORTFOLIO ON SHAREHOLDERS' WEALTH MAXIMIZATION PERSPECTIVE IN BANKING SECTOR OF PAKISTAN

Shahzad Ahmad Khan¹, Muhammad Ahmad² and Iftikhar Hussain Adil³

Abstract

This study is deliberated upon to determine the impact of credit risk on the wealth maximization indicators of shareholders in banking sector of Pakistan. Scheduled banks of State Bank of Pakistan have been taken as a sample for this study. We applied structural equation modeling to test the proposed model and found that credit risk has negative and an insignificant effect on the overall model of shareholder's wealth. In a dimensional model, provisions against Non-Performing Loans (NPLs), EPS and ROE emerged as robust determinants of credit risk and shareholder's wealth. Moreover, we found that NPLs are the main cause of credit risk which has strong penetration on ROE, and EPS.

Keywords: Credit Risk, Shareholder's Wealth, Structural Equation Modeling (SEM), Banking Sector.

JEL Classification: G210

Introduction

Banking sector plays a pivotal role in development of business infrastructure and economic growth of a country (Zamore, Ohene Djan, Alon, & Hobdari, 2018). Banking system is working as a medium of expansion of investment and growth by accepting small investments from general public and offering credit facility to private sectors as well as public sector for the expansion of their

¹ Dr. Shahzad Ahmad Khan, Faculty of Management Sciences, Riphah International University Islamabad, Pakistan.
E-mail: shahzad.ahmad@riphah.edu.pk

² Muhammad Ahmad, Faculty of Management Sciences, National University of Modern Languages, H-9, Islamabad.
E-mail: ahmaddgk7807@gmail.com

³ Iftikhar Hussain Adil, School of Social Sciences and Humanities (S3H), National University of Science and Technology (NUST), Islamabad. E-mail: iftikhar.adil@s3h.nust.edu.pk

business (Sufian, 2012). Due to their pivotal role in economy and market, banking sector is strictly regulated all over the world especially after the financial crisis occurred in 2007-08 (Goldberg, 2009). On the one side, credit facility is a useful tool for business to tackle their short-term and long-term liquidity issues. On the other hand, it creates vulnerabilities for banks when their customer is unable to payback their dues (Ayayi, 2012a).

When the customer of banks is unable to accomplish its promise, in this case credit risk arises. The prudential regulations of State Bank of Pakistan (SBP) stipulate that if borrower fails to fulfill his obligations and after the expiry of 90 days, this loan is classified as a NPL (State bank of Pakistan, 2017). Credit risk is considered as a one of most severe risk in banking sectors all over the world (Ayayi, 2012a). The NPLs are considered as one of the major determinants of financial crisis occurred in 2007-08 (Poole, 2009). In 2007, subprime mortgage market in the US leads toward the bankruptcy investment bank which further cause the international financial crisis all over the world on September 15, 2008 (Füss, Gehrig, & Rindler, 2012; Mellor, 2010).

After the financial crisis, various studies have been conducted to examine the impact of credit risk on the banking sector all over the world such as the role of credit risk in microfinance industry (Ayayi, 2012a), creation of credit risk due to asymmetric information about the creditor defaults rate (Hillairet & Jiao, 2012) and determinants of profitability of banking sectors due to credit risk (Sufian, 2012). Likewise, their successor also focused on the importance of credit risk such as meta-analysis of credit risk and changing dynamics of credit risk after financial crisis (Zamore, Ohene Djan et al., 2018), what credit risk price should be determined for mortgage (Dunsky, Follain & Giertz, 2018), and construction of credit risk model for Euro banks (Gilchrist & Mojon, 2018). Researchers also shed light on the other aspects of credit risk such as environmental scanning while assigning credit to customer (Weber, Hoque, & Ayub Islam, 2015), development of shadow banking system after financial crisis (Liang, 2016), subsequently, what systematic risk can arise due to shadow banking system (Tian, Li, Xue, & Hsu, 2016) and the role of credit risk on interest margin of banking sector (Amuakwa-Mensah & Marbuah, 2015). Likewise, spillover and crossover effects of credit risk and banking financial crisis have also remained the area of interest of various studies e.g. Credit risk and banking sector performance (Vincze, 2008), credit risk while using currency swap (Coppes, 1997), interrelationship between bank's defaults and economic growth and activities (Ongena, 1999), role of institutional regimes in the creation of credit risk (Salas & Saurina, 2002) and role of payment behavior in credit risk (Wilson, Summers & Hope, 2000).

As a result, the role of credit risk is open to be further investigated with perspective of shareholder's primacy theory. Still it is a gray area where we can make our contribution by adding the proposition that how and to what extent credit risk matter in the financial growth and wealth maximization of shareholders. This gap in literature appeals to develop linkages among quality of banking credit policy and shareholder's wealth. We extend our proposition in the domain of

shareholder's primacy theory that how credit policy of banking sectors can create vulnerabilities for the wealth maximization of shareholders' wealth.

Literature Review

Tian et al. (2016) examined the relationship between the systemic risk in the shadow banking sector and its overall impact on all the banks in terms of the losses incurred that might appear directly or indirectly. The model is applied through a network approach with a focus on contagion of balance sheet. Furthermore, to measure the risk transfer, technique applied is loop algorithm. The sample is chosen from the banking sector of China between 2007 and 2012. The research results reveal that the major risks were borne by the commercial banks of China whereas the trust companies caused the major financial instability in China. Zhu and Zhu (2018) examine 11 countries of Eurozone over the period of 2008 till 2013. The purpose is to examine the different risks in different sectors such as sovereign, banking and corporate default and their transmission. The model applied is spatial vector autoregressive (SpVAR). The results depict a positive association between the default risks and the foreign shocks as the figures are significant. Additionally, it can be concluded from the results that majority shocks are borne by the banking sector amongst the three sectors chosen (Tian et al., 2016).

Servátka and Theocharides (2011) examine two different markets that is investment grades and high-yield to investigate the trade on bond issues of corporations in the two markets and compare them. For this purpose classroom experiment was conducted and the students were made familiar with the concepts of credit risk and their expected return. It is observed that there is a low probability for the issues in the investment grades for default and thus their yield is low. Furthermore, it is proposed that there are three main ways to earn more money from the issues in the following manner: from the payments of coupons, bond's face value and the gains from capital. Wilson et al. (2010) investigate the scores payment considering two scenarios. The two settings relate to the prediction of behavior regarding the future payments and the failure of corporation. The sample comprises of 3200 cases chosen from the USA and the UK. The research reveal that future payment behavior of the firms can be predicted with accuracy when data of payment behavior is analyzed and is useful in scenario of trade credit. Whereas it further aids in predicting the behavior for failed corporate models as well (Wilson et al., 2010).

Amuakwa-mensah and Marbuah (2015) examine the Ghana's banking sector. The purpose is to explore the factors that affect Net Interest Margin (NIM) and how NIM is affected in the prevailing financial crisis. The financial crisis period selected is between 2007 and 2009. The technique applied is regression model. The results reveal that in the chosen financial crisis period the NIM dropped at drastic rate which resulted in increased rate of debt. Furthermore, there is marginal difference observed in the determination of factors of NIM in terms of their magnitude and their significance. The most significant factors identified are related to the bank industry and macroeconomic. Ongena (2010) examine the existing literature and put stress on the importance of the banking relationship

with the firms. Their role is crucial owing to the fact that they fulfil the credit needs of the firms and hence build a credible relationship with them which sometimes gets disrupted by the bank defaults. This relationship is further characterized by the risk involved in the banking sector, corporations' finance's cost, activity level as well. The relation is sometimes difficult to predict and anticipate as the defaults in the banks are caused by the internal irregularities and fraudulent practices (Ongena, 2010). Liang (2016) examine the shadow banking which is swiftly growing in the scenario of financial crisis in China. The chosen time period of financial crisis for the study is 2008. The purpose is to evaluate the impact of shadow banking on the growth of economy and its role in financial stability. It is observed that the expansion of shadow banking is owed to the weak regulations, it is easier for such banks to adapt to the changes and adopt those measures which ultimately help in raising the institutional risks. It then leads to the expansion in credit and its growth. This growth is further accompanied by the financial risks and weakens the overall economy. Weber, Hoque, and Islam (2015) examine the banks of Bangladesh to investigate the relationship between the credit risk management and the sustainable performance of commercial borrowers. Multivariate methods are applied for this purpose. The results show that the sustainability and the credit rating process is positively associated as it improves the predictability of this process. Furthermore, the firms that are sustainable are more creditworthy reflecting healthy financial performance. When banks consider sustainability into cognizance it is difficult to commit defaults in credit (Liang, 2016).

Gilchrist and Mojon (2016) examine the banks of Eurozone and add to the literature through construction of indicators of credit risk. These factors are extracted when the period of financial crisis is analyzed that is 2008. Furthermore, it is observed that cost of market funding increased during 2008 for all the banks as well as the non-financial firms. Additionally, the prior crisis did not impact the financial firms for their credit spreads. Whereas, the financial crisis of 2008 created a divergent impact on the financial firms. The whole Eurozone was characterized by the prognostic positive real activity as the credit spreads were observed (Gilchrist & Mojon, 2016). Sufian (2009) examine the banking sector of China owing to the financial reforms in this sector. The purpose is to investigate the determining factors of profitability in China related to banking industry. The sample comprises of 16 banks (state owned and joint stock) over the period of 2000 till 2007. The results reveal that the factors that are positively associated with the profitability are bank size, credit risk and capitalization. The factors that have a negative impact on profitability are liquidity, overhead costs and involvement in networks. Furthermore, the factor of liquidity is different for different types of banks. It is noteworthy that the state owned banks have higher level of liquidity and are more productive and profitable (Sufian, 2009).

Hillairet and Jiao (2012) examined how default probabilities are affected by the different levels of information. The purpose is to investigate this asymmetric information and how it impacts the default by examining the manager's role who have complete information on one hand and the investors who have partial information on the other hand. It is essential that the investors have information of the default threshold at the least. The results reveal that investors do not have enough

information regarding the defaults threshold and cannot predict the estimates whereas the insiders are in a better position to get estimates on the default probability. It can be deduced that the credit risk analysis is significantly influenced by the level of information held on the default threshold (Hillairet & Jiao, 2012). Zamore, Djan, Alon, Hobdari, and Zamore (2018) add to the literature of credit risk management by critically analyzing the prior available literature ranging between 1960 and 2016. The databases that were accessed are Institute for Scientific Information (ISI) Web of Science (WOS). The 1695 articles from different countries were reviewed published in journals of 72 countries. The scholarly investigation revealed that the research in credit risk can be mainly categorized into default able security pricing, default intensity modeling, credit models, credit markets, credit default swap (CDS) pricing and loan loss provisions. Coppes (1997) examine the proposals of the bank for International Settlements that aid in concealing the credit risks that the banks face. These remedial measures are adopted by all the countries as they generate positive results. The purpose is to examine the credit risk exposure when currency swaps are considered. As the exposure is asymmetric in nature so, in case of currency swapping some other factors are also to be considered. These key determinant factors are interest differentials, the volatile nature of interest and exchange rates and lastly the correlation of interest (Coppes, 1997).

Erdoğan (2008) examine the banking sector of Bulgaria during 1997 and 1999. In 1997, the financial crisis severely hit the banking sector of Bulgaria and resulted in reforms in Banking Law making a board for supervision of banks. During that period, multiple banks were also privatized. However, reforms brought a positive impact on the banks and increased their productivity and profitability. The framework adopted was also in cognizance of the standards set by the European Union. The model applied is regression analysis. The research results reveal that the low credit volume of the banks is associated with the cautious behavior of the banks for credit making as well as the strict rules and regulations brought by the reforms. Furthermore those banks which were larger in size had the edge and gained their benefits from the scale economies and improved their profitability as well (Erdoğan, 2008).

Ayayi (2012) examine the micro finance institutions of Vietnam and East Asia Pacific. The purpose is to give valuation of credit risk analysis. Conventional and specialized metrics of evaluations are applied. The results show that credit risk and good governance and financial performance are related to each other. Where there is good governance and sound financial performance there will be low credit risk as risk management tools are implemented in such scenario. Additionally, the key determinant factors that control credit risk in Micro finance institutions are outreach and the write-offs. Espan (2002) examine the commercial and saving banks of Spain during the period 1985 till 1997. The purpose is to examine the determinant factors affecting the bank problem loans. This study takes both the macroeconomic and individual variables into account for the above said purpose using the available panel data. The significant factors identified are growth rate of GDP, number of firms and the level of embeddings in debt, expansion in credit, size of the firm, capital ratio, and margin of net interest and power of market. Furthermore, it has been identified that

significant differences exist between the commercial and saving banks when institutional relevance is considered in order to manage the credit risks (Espan, 2002).

Econometric Models

In order to explain the relationship between credit risk measurement (quality of banks credit portfolio) and shareholder's wealth maximization indicators, The following econometric equation is used: $\text{shareholder's wealth} = \alpha + \delta_1 (\text{RGA}) + \delta_2 (\text{PGA}) + \delta_3 (\text{NLPW}) + \delta_4 (\text{NLPPR}) + \varepsilon \dots \dots \dots (1)$ Where, RGA= Ratio of NPLs to GA, and PGA=Provision against NPLs to GA Ratio, NLPW= NPLs write off to NPLs Provision Ratio and NLPPR= NPLs Provision to NPLs Ratio. These ratios explain the quality banks credit portfolio e.g. (1) the ratio between non-performing loans to the Gross advances explains the quality of the bank's loan portfolio and the amount of bank assets in a dangerous situation and also shows that the degree of risk involved in the total advances is to lend to the client, (b) provision against NPLs is the most important percentage of risk because it indicates the provision allocated for loss of banks that ultimately affect the wealth of shareholders, (c) NPLs write-off ratio shows how much amount of loan has been converted into loss and (d) last but not least is NPLs provision which indicates the amount of the proposed amount against the non-performing loans and actual amount of the loan.

This model is further divided into dimensional equations such as:

$$\text{ROE} = \alpha + \delta_1 (\text{RGA}) + \delta_2 (\text{PGA}) + \delta_3 (\text{NLPW}) + \delta_4 (\text{NLPPR}) + \varepsilon \dots \dots \dots (2)$$

$$\text{EPS} = \alpha + \delta_1 (\text{RGA}) + \delta_2 (\text{PGA}) + \delta_3 (\text{NLPW}) + \delta_4 (\text{NLPPR}) + \varepsilon \dots \dots \dots (3)$$

$$\text{ROCE} = \alpha + \delta_1 (\text{RGA}) + \delta_2 (\text{PGA}) + \delta_3 (\text{NLPW}) + \delta_4 (\text{NLPPR}) + \varepsilon \dots \dots \dots (4)$$

$$\text{ROR} = \alpha + \delta_1 (\text{RGA}) + \delta_2 (\text{PGA}) + \delta_3 (\text{NLPW}) + \delta_4 (\text{NLPPR}) + \varepsilon \dots \dots \dots (5)$$

Where, ROE (return on equity) shows that how much amount is available for shareholder on their investment amount, (b) EPS (earnings per share) indicates how much investors are getting profit on each share (c) ROCE (return on capital employed) represents the ratio of capital investment efficiency to profitability and (d) ROR (return on revenue) depicts how much amount is available for investor on total revenue earned-it also shows the cost efficiency of management of banking sectors in Pakistan.

Methodology

To test our proposition that to what extent credit risk and its measurement impact on shareholder's wealth maximization of banking sector in Pakistan, we collected the data from state

bank of Pakistan (Financial analysis reports). For this purpose, we selected the banks using the systematic sampling technique. Total 34 banks are enlisted under the umbrella of State Bank of Pakistan (SBP). The Pakistan State Bank stands on 1 July 1948 at the height of responsibility and is responsible for the operation of the banking system in Pakistan (Agreement, 2014). Other banks that make up the banking structure in Pakistan play an active role in the country's economic development (Pakistan, 2014). The sample of the study is comprised of total seventeen banks which include four public sectors banks, seven Islamic banks and six private sector banks working in Pakistan.

Considering the construction and layout of our models, we applied two statistical techniques on i.e. MANOVA and Structural Equation Modeling (SEM)(Bauldry, 2015; Mean, 2006; Sthle & Wold, 1990). In prior literature, SEM (Psy & Modeling, 2017) is considered much better statistical measurement as compared to MANOVA (Horn, 2008) in term of Model fitness indicators and co-efficient as well. Keeping in view to model fitness indicators and authenticity of results, we used SEM to analyze the data. The data was collected from the financial sector analysis reports of SBP (2007-2017).

Findings of Overall Model

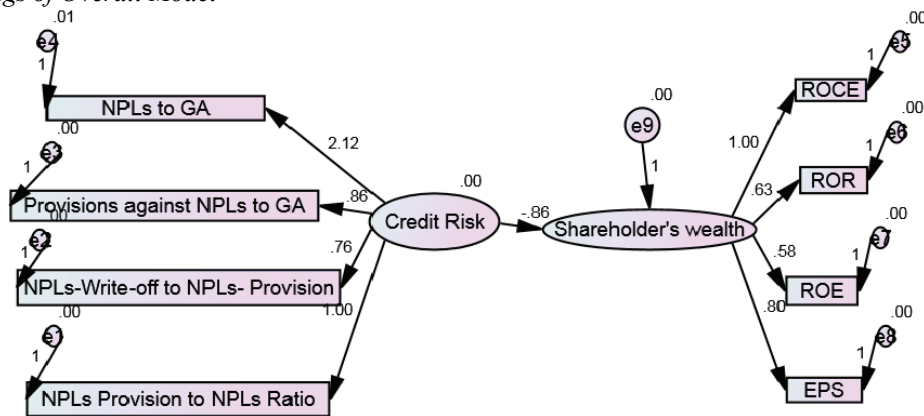


Figure 1: Structural equation modeling

This model is constructed by using data of 17 commercial banks enlisted on State bank of Pakistan form 2007 to 2017. There are two latent variables that are credit risk and shareholder's wealth and their dimensions. Five model fit indexes that are GFI, AGFI, NFI, CFI and RMSEA have been used to test the model fitness. Value of GFI=.980(standard value=>0.090), AGFI=.962 (standard value=>0.090), CFI= 0.991 (standard value=>0.090), RMSEA= 0.035 (standard value <0.10) respectively. These show that model is fit.

Result of SEM (in table 1 & figure 1) shows that credit risk ($\beta = -0.862, p < 0.05$) has negative impact on shareholder's wealth of banking sector of Pakistan. Credit risk is the risk of debt default that

may arise from the failure of the borrower to make the required payments. In the first resort, the risk by the lender includes loss of capital and interest, disruption of cash flows, and increased collection costs. The loss may be complete or partial (Martin & Wilde, 2002). In an efficient market, higher levels of credit risk will be associated with higher borrowing costs which ultimately reduce the profitability of banking sector in Pakistan (Kasana & Naveed, 2016). Numerous reasons have been explored with regard to credit risk such as; (a) cost push inflation, (b) energy crisis and (c) depreciation of Pakistani currency (Abbas, Zaidi, Ahmad, & Ashraf, 2014; State bank of Pakistan, 2017). Keeping in view to these risks, to limit the credit risk of the lender, the lender may conduct a credit check on the prospective borrower and may require the borrower to obtain appropriate insurance, such as mortgage insurance, or seek a guarantee on some of the borrower's assets or a third party guarantee (Capiński & Zastawniak, 2016). Result of dimensions of both variables is significant which shows that these dimensions are measuring the concept of their latent variables in better way. Keeping in view to current circumstances of Pakistan's economy, commercial banks use their own strategies and measures (credit scorecards) to classify their borrower for risk identification, and then they use suitable strategies to mitigate their risks (Faizan Ahmed & Ali Malik, 2015).

Table 1
Result of Overall Model

			Co-efficient	Std error	C.R	P
Shareholder's wealth	<---	Credit Risk	-0.862	0.09	-9.55	***
NPLs to GA	<---	Credit Risk	1			
Provisions against NPLs to GA	<---	Credit Risk	0.762	0.079	9.599	***
NPLs-Write-off to NPLs- Provision	<---	Credit Risk	0.863	0.092	9.407	***
NPLs Provision to NPLs Ratio	<---	Credit Risk	2.123	0.225	9.425	***
EPS	<---	Shareholder's wealth	1			
ROE	<---	Shareholder's wealth	0.629	0.069	9.07	***
ROR	<---	Shareholder's wealth	0.577	0.052	11.042	***
ROCE	<---	Shareholder's wealth	0.802	0.073	11.029	***

This table depicts the result of SEM for the 17 commercial banks of Pakistan during the period of 2007 to 2017. ** and *** show the significance level at 95% ($p < .05$) and 99% confidence ($p < .01$) respectively

Findings of Dimensional Model

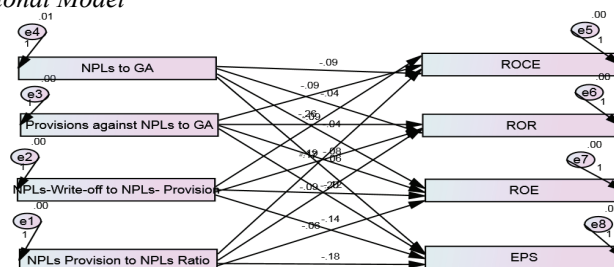


Figure 2: Structural equation modeling on the basis of observed variable

This model is constructed by using data of 17 commercial banks enlisted on State bank of Pakistan form 2007 to 2017. Five model fit indexes that are GFI, AGFI, NFI, CFI and RMSEA have been used to test the model fitness. Value of GFI=.920(standard value=>0.90), AGFI=.902 (standard value=>0.90), CFI= 0.961 (standard value=>0.90), RMSEA= 0.056 (standard value <0.10) respectively. These show that model is fit.

The results of dimensional model (in table 1 & figures 1) shows that co-efficient of each dimensions of credit risk have significant negative impact on the wealth of shareholder. This depicts that if the credit risk portfolio or quality of assets of banks is not sound and not strategized to tackle the potential credit risk will lead to distortion in increase of wealth of shareholders. This also depicts that in banking sector, shareholder protection measures can only be achieved through the mitigation of potential credit risk. Due to lack of growth opportunities and high cost of business, the customers of banking sector of Pakistan specially textile industry and cement industries are in weak financial position (Samreen, Student, Zaidi, & Sarwar, 2013), due to this, they are not be able to complete their obligation in due course of business. In result, magnitude of non-performing loans is on higher side in Pakistan (Ali, 2013).

Table 2
Result of Dimensional Model

			Co-efficient	Std error	C.R.	P
Earnings per share	<---	δ	-0.062	0.014	-4.348	***
Return on equity	<---	δ	-0.043	0.01	-4.185	***
Return on Revenue	<---	δ	-0.044	0.015	-2.877	***
Return on capital employed	<---	δ	-0.091	0.016	-5.548	***
Earnings per share	<---	δ	-0.086	0.04	-2.136	***
Return on equity	<---	δ	-0.094	0.037	-2.532	***
Return on Revenue	<---	δ	-0.079	0.025	-3.083	***
Return on capital employed	<---	δ	-0.122	0.035	-3.453	***
Earnings per share	<---	δ	-0.258	0.047	-5.504	***
Return on equity	<---	δ	-0.192	0.043	-4.432	***
Return on Revenue	<---	δ	-0.204	0.03	-6.878	***
Return on capital employed	<---	δ	-0.145	0.041	-3.52	***
Earnings per share	<---	δ	-0.175	0.031	-5.618	***
Return on equity	<---	δ	-0.086	0.029	-2.991	***
Return on Revenue	<---	δ	-0.062	0.02	-3.125	***
Return on capital employed	<---	δ	-0.18	0.027	-6.595	***

This table depicts the result of SEM for the 17 commercial banks of Pakistan during the period of 2007 to 2017. δ_1 , δ_2 , δ_3 , δ_4 shows the beta co-efficient of Ratio of NPLs to GA, Provision against NPLs to GA Ratio, NPLs write off to NPLs Provision Ratio and NPLs Provision to NPLs Ratio respectively. ** and *** show the significance level at 95% (p<.05) and 99% confidence (p<.01) respectively.

Conclusion

The aim of the study was to find out the impact of credit risk portfolio on the wealth of shareholders of banking sector. For this purpose, we selected seventeen commercial banks enlisted on SBP as a statistical framework. Using SEM, we reported that credit risk has strong penetration on earning maximization and wealth maximization of shareholders. We assumed that protection of shareholders interest in banking sector can only be achieved through enhancing the quality of credit risk portfolio. It is also found that non-performing loan has strong penetration on the wealth indicators of shareholders. This is may be due to economic condition of economy such as; (a) increase in cost of business, (b) depreciation of Pakistani currency and (c) energy crisis in Pakistan. Secondly, during this period government of Pakistan has taken a large amount of external debt from IMF and World Bank which causes the financial pressure of the financial sector of Pakistan. On the hand, due to terror issue in Pakistan, and energy crisis, overall production of domestic industries is very poor. As a result, they are not able to fulfill their commitments in due course of business.

The findings of the study are quite helpful for the policy makers of financial institutions in Pakistan as well as for managers working in the banking industry. Theoretical insights of the study shed light on the sensitivity of credit risk portfolio in Pakistan. High level of management of banking sectors are required to strategize their credit portfolio in a better manner, so they would be able to minimize the severity of risk. For future research, scholars may consider the systemic risk and sovereign risk as controlling factor while measuring the impact of credit risk.

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