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Impact of Macro-economic Factors on Credit Risk. The Moderating Effect of Market Concentration: An Evidence from Pakistan.

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The purpose of this study is to investigate the significant impact of macro-economic factors on the level of credit risk and, to determine the moderating effect of Market concentration (HHI) on relationship between the macro-economic factors and credit risk of banking sector in Pakistan. We apply GMM estimation model on time series data for the period of 2000 to 2017. Consistence with the existence literature, we found a positive and significant impact of export of goods and services, foreign exchange rate and un-employment rate on the level of credit risk. While the gross domestic product growth rate, import goods and services and stock market capitalization found a negative and significant impact on the level of credit risk. Therefore, we found that market concentration has significantly moderate the relationship between macro-economic factors and the level of credit risk, except gross domestic product growth rate. In other words, when all macro-economic indicators stand on a better position specifically, it leads to decrease in the level of credit risk. This study is conducted to help the commercial banks and regulatory authorities to change their loaning policy and procedure, as per the change in factors that determine the credit risk (NPL).

Keywords: Credit Risk, Market Concentration, Macro-economic Factors.

INTRODUCTION

It has been found in a recent financial crisis that economic re cession and transaction deteriorationare caused by financial sect or insolvency. The allocation of funds both from the savers and those of the users of the funds become possible only due to these financial institutions which add to the economy their role (Fukida & Dahanlan, 2012). A healthy banking sector is necessary for economic development because, it ensures to construct sound financial institutions and economic stability (Jovovic, 2014). However, the deregulation process has strengthened competition among the banks over the past two decades. The competitive environment amon financial institutions has now turned very stronger in consideration of the credit risk, i.e. bad loan screening procedures on their loan portfolios and relaxing borrowing criteria is the cause of credit risk (Manove et al, 2001; Bolt & Tieman, 2004; Jeong & Jung. 2013). The loans that are termed as non-performing, have increased in volume significantly thus having an impact on both profitability as well as liquidity of the financial/banking sector. This impact of non-performing loan has also shacked the financial stability of the banking system as well in general and on macro-economic.

Independent analysts therefore use available data of macro-economic indicators, bank specific factors and industry specific factors, and examine its significant empirical impact on the level of credit risk in banking sector by using statistical techniques (Ahmad & Bashir, 2013; Badar & Javid, 2013; Hassan, Ilyas & Rehman, 2015). The issue with such types of analysis is that this approach studies just one aspect of complex problem. These studies have ignored the analysis of the potential of banks or banking systems to absorb shocks (Henry et al, 2013).

Financial system of Pakistan has not been analyzed by any independent analysts for its potential to absorb shocks. Banking system controls 74 percent assets of the overall financial system of Pakistan (SBP Financial Stability Review, 2016). The basic purpose of the study is to prevent the Financial System of Pakistan (surrogated by banking system of Pakistan) for its persistence to absorb macro-economic shocks.

However, the banking sector is said to be the most influential sector in the emerging economies because of the intermediary characteristics of the banks in trade and business transactions etc. This research study aims to cover multi-dimensions. At first, the in-depth analytical views about the financial soundness and reliability of the economic scenario are going to be provided by this study based on banking sector analysis of how much an economy financially stabilizes. The second thing aim to discover the dominating macro-economic signs of credit risk falling in the financial world. Third, analysis in this study has been done that how increase competition between banks has affecting on credit risk in Pakistan.

Objective of the Study

The main objective of the research attempted to achieve the following objectives:

- To examine the significant impact of macro-economic factors on the level of commercial banks' credit risk in the Pakistan.
- To examine the moderating effect of Market concentration (HHI) on association between the macro-economic factors and credit risk.

Research Questions

- Is there a significant impact of macro-economic factors on the level of credit risk of commercial banks in the Pakistan?

- Is there a moderating effect of Market concentration (HHI) on association between the macro-economic factors and credit risk?

Significance of the Study

In banking industry prosperous economic scenario is one of the main reasons of profitability when all macro-economic indicators stand on a better position This study will have focused on banking sector in Pakistan. Commercial banks lend money to all sector of the economy and government but the increasing defaults on loan is also the matter of worry for this sector. This study is conducted to help the commercial banks and regulatory authorities to change their loaning policy and procedure, as per the change in the causes that determine the NPL.

LITERATURE REVIEW

The impact of macro-economic factors and credit risk have been studied in the literature. The economic development process is relating to small number of bad loans, mean very low level of credit risk bear by banking sector. However, an increase in bad loans has adverse consequences in the recession period. After the outbreak of financial crises in autumn 2008, the macro-economic factors of credit risk (NPL) and the bank assets' quality in general has caused the interest to exist substantially. There are several studies that have investigated this financial scenario interacting the wide scope of economy. The clear example is who developed the concept of "financial accelerator", arguing that, debt market are pro-cyclical that the asymmetric information between lender and borrowers, and the statement financial position deals to propagate and amplifying shock of economy (Bernanke & Getler, 1989; and Bernanke, Getler & Gilchrist, 1998).

Investigating the effect of macro-economic elements concerning the credit-risk, the study has found the impact of factors such as gross domestic product growth rate, employment, Inflation, and export growth in transition countries and find that gross domestic product growth rate and inflation negative and significant impact on the level of credit risk, while un-employment is positively related to credit risk (Mazreku et al., 2018). The study is going to examine the capital effect on the efficiency of the banks through its credit risk in OECD countries. They found that higher capital levels held by banks leading to greater efficiency but failing to reduce bank risk (Bitar et al., 2018).

Analyze Colombian banks to conclude that higher capitalization level leads to higher efficiency. However higher risk exposure is associated with lower cost efficiency but higher levels of profit efficiency (Galan, 2017). Data of 22 commercia banks of Bangladesh banking sector used for analysis and range from 2005 to 2014, and it is provided evidence for a positive sensitivity to un-employment and negative sensitivity to inflation rate and interest rate, (Mondal, 2016).

Examine the association between factors and credit risk of commercial of Malaysian banking sector. The sample draw from 15 commercial bank and 13 Islamic banks with the range from 2000 to 2010 and cover and find that risky sector financing. For the possibility of the loss of the loan, ratios such as debt-to-assets, regulatory capital, size, liquidity effect on cedi risk of conventional banks. The same situation can be traced in Islamic banks 'contracts and regulatory capital. As for macro-economic elements & M3 are significantly impact (Waemustafa & Sukri, 2015).

In this empirical study, found that the association of NPL and macro-economic factors in banking sector of Pakistan (Ikram et al., 2016). The financial sector of Italy, Greece and Spain have used the method of panel data from 2004 to 2008 to investigate the relationship of macro-economic variable includes GDP, un-employment portion, actual rate of interest and other important financial variables like ROA, loan loss reserve of the bank and change on the loan granted. And result shows that the GDP and ROA are negatively associated with the NPL Furthermore, real interest rate, un-employment rate and loan losses reserve of the bank positively effect on NPL (Messai & Jouini, 2013).

In this paper the researcher focuses to examine the association between the macro-economic factors and the credit risk of banks in a GIPSI group of countries (Greece, Ireland, Portugal, Spain and Ital). The cr. risk volume gets high when GDP growth and the share and housing price indices decrease. In the same way, it rises when un-employment percentage, ratio of interest, & growing trend, the appropriate exchange rate also affect the appreciating trend (Castro, 2013; and Nikolaidou & Vogiazas, 2014).

The empirical study examines the factors that affect the credit risk of Bulgarian banking sector commercial banks from 2000 to 2010. Our paper's contribution is twofold: it uses the ARDL modeling, which is hardly used in the cincerned research, but it explores different affects of the Greek bad period. The outcomes suggest the Bulgarian banks ' cr.risk elements must search the endogenously in macro-economic scenario, in accordance with previous studies. We prove a strong role for the crises that was faced globally and the regulatory framework for the banks of the country. The debt-crisis in Greek seems to play an immaterial role in the Bulgarian banking system, indicating that Greek banks were not a Trojan horse.

According to Souza and Feijo (2011), default risk factors show the economic activity-level and the simple rate of interest as well. The paper also analyzes reaction shown by financial sector and suggests alternate approaches. For the period from 2000 to 2006 in Brazil, the assumption that credit risk is the result of an interactive process between banks and the economic environment is confirmed. The results also point to differences in private and public banks ' behavior. Based on previous studies, however, it was found that the macro-economic environment affects the borrower of the evaluation and their ability to repay their loans. Growth in the economy favors revenue growth and a reduction in financial distress.

Theoretical/Conceptual Framework

Credit Risk

This study measured credit risk as the ratio of non-performing loans to gross loans (Der-Fen, 2005; Kolapo, Ayeni & Oke, 2012; Michael, William & Gary, 2001). The ratio of non-performing loans is often widely used to

measure the credit risk in the commercial banking sector to reflect the credit quality of commercial banks (Salas & Saurina, 2002; Jimenex & Saurina, 2007; and Louzis et al., 2012).

Export of Goods and Services to GDP

According to Clichici & Colesnicova (2014) has found the evidence regarding the impact of economic condition. Fluctuation in export of the country would be led to fail in generation of revenue suffering by companies, therefore the companies facing problem in ability of repayment of their financial obligation. This contributes to enhancing the non-performing loan to total loan. Export growth has significant impact on NPL (Morina & Misiri, 2018).

Foreign Exchange Rate

Previous studies have found the positive association between exchange rate volatility and credit risk to be significant. Consequently, currency volatility increases the fragility of the economy (Chaibi Fiti, 2015; Farhan, 2012; and Klein, 2013).

2.1.4 Gross Domestic Product Growth Rate

Defines the total market value of goods or services produced domestically by country as a change. The negative association between GDP growth rate and credit risk has been found in several empirical studies (Dash & Kabra, 2010; Jameel, 2014; Klein, 2013; and Morina & Misiri, 2018).

Import of Goods and Services to GDP

It is the ratio of the goods and services being obtained from other countries in terms of imports and the value of these goods and services in the rest of the world. These can be taken included the value of goods and insurance as well, travelling and transport, freight services and royalties, license fee and financial, communication, information business and personal/governmental services.

Un-employment

Most studies found the positive association between un-employment and credit risk. Therefore, because of un-employment, the borrower faces difficulties in repaying their loans. The positive relationship between un-employment and credit risk has been investigated by several empirical studies (Thalassinos et al., 2015; Morina & Misiri, 2018; Kurumi & Bushpeps, 2017; Farhan et al., 2012; Konstantakis et al., 2016; and chaib & Ttiti, 2015).

Stock Exchange Capitalization to GDP

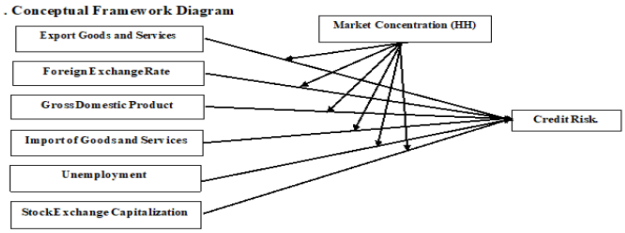
If the market at general is undervalued or overvalued is determined by the ratio of capitalization and GDP. The ratio so obtained can be best utilized by focusing on the specific markets or it can also be generalized overall. It is measured as capital divided by GDP

Herfindahl-Hirschman Index

Herfindahl-Hirschmann index (HHI) measured by the sum of the square of market share of all banks. The arguments in favour of de-stabilization the competitive effect has been established as both positive as well as negative impacts have been found in previous studies (While Keeley, 1990; Helmann et al., 2000; Repullo, 2004; Levy-yeyati & Micco, 2007; and Delis & Pasiouras, 2009).

The other renowned researchers such as Boyd and De Nicolo (2005), Boyd et al. (2006), and De Nicolo and Loukoinova (2007), obtained the results by showing that there is a more risk involved in the banks due to the concentration of the financial market. This can lead to the ambiguous effect for HHI variable.

Conceptual



METHODOLOGY

The time series data has been used on the impact of macro-economic factors on credit risk. The data collected from the World Bank, World Economic Indicators and Central Banks of Pakistan's websites over the period 2000–2017.

Model Description

This study has revealed the effect of macro-economic factors on the risk through credit using a time series data and moderating effect of market concentration in Pakistan. The methodology used is generalized method of moments (GMM ESTIMATION MODEL) using the software program E-Views 9. The possible happening of the relationship was measured by general regression model:

$$Y_{it} = \alpha_0 + \sum_{j=1}^{k} \alpha j \, Xj, it \, + \epsilon_{it_{it}}$$

Using an econometric model, the fundamental goal is to investigate how macro-economic factors affect credit risk. It is widely accepted that when examining he time series estimates endogeneity should be considered. Usually the endogeneity is controlled by fixed effects and instrumental variables (IV) estimators. Fixed effects estimators, however, cannot strictly control endogeneity. Similarly, according to Himmelberg et al. (1999) Estimators of instrumental variables (IV) require the strong external instrumental variables (IVs), which are very difficult to measure. Generalized method of moments (GMM) estimation has been widely used in many types of econometric models (Hansen, 1982). According to Hansen (2001) Empirical methods used by time series data to estimate dynamic economic systems. Through design. Estimating equations implied by some components of a dynamic economic system use the resulting generalized-method-of-moments estimation and inference methods. It has no doubt that GMM estimation model will continue to be vital to macro econometric research for the foreseeable future (Hansen & Kenneth, 2002). The generalizability of this study can easily be witnessed as the empirical reveal the noncausality is very obvious among economic variables (Lanne & Saikkonen, 2009). The GMM estimation model that has been developed by Arellano and Bond

(1991), which was generalized later by Arellano and Bover (1995), and Blundell and Bond (1998), due to which the issues of endogeneity and dynamic panel bias have been resolved (Baltagi, 2008).

This model is estimation equation as follows:

GMM estimation model is implemented into the estimation equation as follows:

$$CRT_{it} = \alpha + EGS\beta + FER\beta + GDPGR\beta + IGS\beta + UNEMR\beta + SXC\beta + \epsilon_{it} \quad \text{(Model 1)}$$

$$CRT_{it} = \alpha + (EGS * HHI)\beta + (FER * HHI)\beta + (GDPGR * HHI)\beta + (IGS * HHI)\beta + (UNEMR * HHI)\beta + (SXC * HHI)\beta + \epsilon_{it} \quad \text{(Model 2)}$$

Table 3. Definition of study variable

Variable	Code	Definition
Credit Risk	CRT	"which is measured as the ratio of non-performing loans to total (gross) loans in percentages".
Export of Goods and Services to GDP	EGS_GDP	"Exports of goods and services represent the value of all goods and other market services provided to the rest of the world."
Foreign Exchange Rate	FER	"A foreign exchange rate is the price of the domestic currency stated in terms of another currency".
Gross Domestic Product Growth Rate	GDPGR	"change total market value of goods or services produce by country domestically".
Import Goods and Services to GDP	IGS_GDP	"Imports of goods and services represent the value of all goods and other market services received from the rest of the world".
Stock Exchange Capitalization to GDP	SXC_GDP	"The stock market capitalization-to-GDP ratio is a ratio used to determine whether an overall market is undervalued or overvalued compared to a historical average".
Bank Concentration (Herfindahl-Hirschmann index)	HHI	"Herfindahl-Hirschmann index (HHI) computed as the sum of squared market shares of all banks".

Where:

CRT_{it}= Non-performing loan to total loan at time t.
EGS_{it}= Export of goods and services to GDP at time t.
FER_{it}= Foreign exchange rate against dollar at time t.
$GDPGR_{it}$= Gross domestic product growth rate at time t
ISG_{it}= Import of goods and services to GDP at time t
$IUNEMR_{it}$=Un-employment rate at time t
SXC_{it}= Stock exchange capitalization to GDP at time t.
HHI_{it}= Market Concentration calculated by Herfindahl-Hirschman Index at the time t.
α is the "Constant-term", β is "Coefficients of the explanatory variables" and εit is the "Error-term".

Result and Discussion

Descriptive Analysis

Table 4 provide the detail of descriptive analysis, include mean, median standard deviation, skewness and kurtosis of macro-economic factors and credit risk during the study period from 2000 to 2017. The study sample shown that the maximum credit risk 23.4%.

Table 4. 1 Descriptive statistics of variable

	NPL	EGS_GDP	FER	GDPGR	IGS_GDP	UNEMR	SXC_GDP
Mean	13.26783	13.16224	78.42189	4.321392	18.43547	8.370333	23.09632
Median	12.20974	13.35924	76.06046	4.535582	19.04162	7.773500	23.60955
Maximum	23.40000	16.71897	112.4400	7.667304	23.21189	14.12600	41.41480
Minimum	7.297959	8.240000	53.64819	1.606692	14.63323	1.304000	7.466460
Std. Dev.	4.778087	2.211055	20.25402	1.788629	2.405725	4.067723	9.945936
Skewness	0.701852	-0.628634	0.279813	0.180593	-0.066160	-0.106811	0.065781
Kurtosis	2.551953	3.010815	1.496157	2.273728	2.292579	2.005571	1.978465
Jarque-Bera	1.628347	1.185629	1.931043	0.493445	0.388465	0.775892	0.795632
Probability	0.443005	0.552769	0.380785	0.781358	0.823467	0.678449	0.671786
Sum	238.8209	236.9202	1411.594	77.78506	331.8385	150.6660	415.7338
Sum Sq. Dev.	388.1119	83.10903	6973.830	54.38629	98.38771	281.2884	1681.668
Observations	18	18	18	18	18	18	18

Correlation Analysis

Table 4.2 shows the Pearson Correlation coefficient of different variable in our model. Correlation coefficient between the different explanatory variable s are positive and negative both. The relationship between credit risk (NPL) EGS_GDP and UNEMR are positive as 0.4185 0.555 respectively. The relationship between credit risk (NPL) and FER, GDPGR, IGS_GDP and SXC_GDP are negative as -0.2895, -0.5093, 0.6487 and -0.90404 respectively.

Table 4. 2 Correlation matrixes

	NPL	EGS_GDP	FER	GDPGR	IGS_GDP	UNEMR	SXC_GDP
NPL	1.000000						
EGS_TO_GDP	0.418568	1.000000					
FER	-0.289454	-0.805342	1.000000				
GDPGR	-0.507936	0.038600	-0.075014	1.000000			
IGS_TO_GDP	-0.648745	-0.295816	0.295451	-0.161695	1.000000		
UNEMR	0.355503	0.449758	-0.683100	0.282654	-0.577162	1.000000	
SXC_TO_GDP	-0.904037	-0.202465	0.100959	0.669776	0.459525	-0.169946	1.000000

Generalized Method of Moment Estimation (GMM)

Model 1

$$CRT_{it} = \alpha + EGS\beta + FER\beta + GDPGR\beta + IGS\beta + UNEMR\beta + SXC\beta + \epsilon_{it}$$

Consistent with the previous studies, the result we found that a negative and significant impact of GDP growth rate on credit risk and consistent with empirical evidence by Dash & Kabra (2010); Jameel (2014); Klein (2013); and Morina & Misiri (2018). Export goods and services to GDP has a positive and significant effect on credit risk, and this result has consistent with previous studies (Clichici & Colesnicrva, 2014). Foreign exchange rate indicates the positive /significant impact on the credit-risk. This result can be attribute to the strengthen of foreign exchange rate given bad effect on ability of borrower to repay their loan and consistent with the finding of Chaibi & Fiti (2015); Farhan (2012); and Klein (2013). The study conclude that the un-employment has positive and significant impact on credit risk. Unemployed customer cannot meet their financial obligation which can enhance the level of credit risk. The finding confirmed to empirical studies conducted by (Thalassinos et al., 2015; Morina & Misiri, 2018; Kurumi & Bushpeps, 2017; Farhan et al., 2012; Konstantakis et al., 2016; and chaib & Ttiti, 2015). Concerning the import of goods and services to GDP, through this study, investigated a positive and significant impact on the level of credit risk. Regarding the stock exchange capitalization to GDP, this study found a negative and positive impact on level of credit risk.

Table 4.3. Generalized Method of Moment Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	20.71522	6.040304	3.429500	0.0056
EGS_TO_GDP	0.691460	0.188060	3.676811	0.0036
FER	0.045218	0.018648	2.424840	0.0337
GDPGR	-0.713041	0.295471	-2.413233	0.0344
IGS_TO_GDP	-0.694144	0.258965	-2.680456	0.0214

UNEMR	0.154846	0.145778	1.062204	0.3109
SXC_TO_GDP	-0.238677	0.058361	-4.089688	0.0018
R-squared	0.936772			
Adjusted R-squared	0.902283			

Dependent Variable: NPL
Instrument specification: EGS_TO_GDP FER GDPGR IGS_TO_GDP UNEMR

Table. 4.4 Result of study hypothesis

Model 1:		
H1:	Export of goods and services has significant Impact on bank credit risk of banking sector in Pakistan	Accepted
H2:	Foreign exchange rate has significant Impact on bank credit risk of banking sector in Pakistan	Accepted
H3:	Gross domestic growth rate has significant Impact on bank credit risk of banking sector in Pakistan	Accepted
H4:	Import of goods and services has significant Impact on bank credit risk of banking sector in Pakistan	Accepted
H5:	Un-employment rate has significant Impact on bank credit risk of banking sector in Pakistan	Accepted
H6:	Stock market capitalization has significant Impact on bank credit risk of banking sector in Pakistan	Accepted

Model

$$CRT_{it} = \alpha + (EGS * HHI)\beta + (FER * HHI)\beta + (GDPGR * HHI)\beta + (IGS * HHI)\beta + (UNEMR * HHI)\beta + (SXC * HHI)\beta + \in_{it}$$

Table 4.5 shown that the market concentration (HHI) has found the significant moderate relationship between macro-economic factors and the credit-risk, except GDP growth rate, while the this found that market concentration (HHI) has insignificant moderate between the rate of GDP growth and the cr. risk.

Table 4.5 Generalized Method of Moment Estimation

Table. 4.6 Result of study hypothesis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.725576	2.058263	4.725137	0.0006
EGS_TO_GDP*HHI	0.000799	5.91E-05	13.51738	0.0000
FER*HHI	5.71E-05	1.41E-05	4.045360	0.0019
GDPGR*HHI	-0.000133	0.000101	-1.313089	0.2159
IGS_TO_GDP*HHI	-0.000356	6.60E-05	-5.396679	0.0002
UNEMR*HHI	-0.000211	6.76E-05	-3.116922	0.0098
SXC_TO_GDP*HHI	-0.000169	3.26E-05	-5.163186	0.0003
R-squared	0.980266			

Dependent Variable: NPL
Instrument specification: EGS_TO_GDP*HHI FER*HHI GDPGR*HHI IGS_TO_GDP*HHI UNEMR*HHI SXC_TO_GDP*HHI

Model 2:		
H7:	Market concentration (Herfindahl-Hirschmann index) moderate the relationship between Export of goods and services and of banking sector in Pakistan	Accepted
H8:	Market concentration (Herfindahl-Hirschmann index) moderate the relationship between Foreign exchange rate and of banking sector in Pakistan	Accepted
H9:	Market concentration (Herfindahl-Hirschmann index) moderate the relationship between Gross domestic growth rate and of banking sector in Pakistan	Rejected
H10:	Market concentration (Herfindahl-Hirschmann index) moderate the relationship between Import of goods and services and of banking sector in Pakistan	Accepted
H11:	Market concentration (Herfindahl-Hirschmann index) moderate the relationship between Un-employment rate and of banking sector in Pakistan	Accepted
H12:	Market concentration (Herfindahl-Hirschmann index) moderate the relationship between Stock market capitalization and of banking sector in Pakistan	Accepted

Conclusion

The study sought reveal the aspects relating macro-economic on credit risk of banking sector in Pakistan and moderating effect macro-economic factors and the credit-risk element and data from 2000-2017 was used employing a GMM estimation model estimation model. In order to achieve the certain objectives, the explanatory variables included export of goods and services, foreign exchange rate, gross domestic product growth rate, import of goods and services, un-employment and stock market capitalization, market concentration use as a moderation. The DV was the bank credit-risk that has been represented by NPL to total loan ratio. The research study further employed time series, GMM estimation model estimation to ascertain the impact of macro-economic factors on credit risk. This study found to have a positive and significant impact of export of goods and services, foreign exchange rated, and un-employment rate on credit-risk. From this observed situation, the involvement of bank tends to reduce the risk of credit that are attributed to more stability. While the gross domestic product growth rate, import goods and services and stock market capitalization, reveal a negatively significant impact on credit risk. It shows that it has enhanced the credit risk (NPL). Hence posing an economic instability alert there. In the meanwhile, Market concentration (HHI) looks significantly moderating the relation in between macro-economic factors and credit-risk, except gross domestic product growth rate, market concentration (HHI) found to insignificant moderate between the b/w GDP growth rate and credit risk.

References

Ahmad, F., & Bashir, T. (2013). Explanatory power of macro-economic variables as determinants of non-performing loans: evidence from Pakistan. World Applied Sciences Journal, 22(2), 243-255.

Badar, M., & Javid, A. Y. (2013). Impact of macro-economic forces on nonperforming loans: An empirical study of commercial banks in Pakistan. Wseas Transactions on Business and Economics, 10(1), 40-48.

Bernanke, A. and Gertler, M (1989). "Agency Costs, Net Worth, and Business Fluctuations", The American Economic Review, Vol. 79, No. 1 pp. 14-31

Bitar, M., Pukthuanthong, K., & Walker, T. (2018). The effect of capital ratios on the risk, efficiency and profitability of banks: Evidence from OECD countries. Journal of International Financial Markets, Institutions and Money, 53, 227-262.

Bolt, W., Tieman, A. F. (2004). Banking Competition, Risk and Regulation. International Monetary Fund Working Paper WP/04/11.

Castro, V. (2013). "Macro-economic determinants of the credit risk in the banking system: The case of the GIPSI", Economic Modelling, 31, p. 672–683.

Chaibi, H. and Ftiti, Z. (2015). "Credit risk determinants: Evidence from a cross-country study", Research in International Business and Finance, 33 (2015) 1–16.

Clichici, D., Colesnicova, T. (2014). The impact of macroeconomic factors on non-performing loans in the Republic of Moldova. Journal of Financial and Monetary Economics, Centre of Financial and Monetary Research "Victor Slavescu", 1(1), 73-78.

Der-Fen, H. (2005). The Predictive Power of Capital Adequacy Ratios on Bank Risk. Journal of Contemporary Accounting, Vol 6, pp,1-22.

Dash, M. K., & Kabra, G. (2010). The determinants of non-performing assets in Indian commercial bank: An econometric study. Middle Eastern Finance and Economics, 7(2), 94-106.

Fukuda, T., Dahalan, J. (2012). Finance - Growth-Crisis Nexus in Asian Emerging Economies: Evidence from VECM and ADRDL Assessment. International Journal of Economic Sciences and Applied Research, 5(2), 69–100.

Galán, J. E. (2017). The influence of risk-taking on bank efficiency: Evidence from Colombia. Emerging Markets Review, 32, 52-73.

Hassan, H. U., Ilyas, M., & Rehman, C. A. (2015). Quantitative study of bank-specific and social factors of non-performing loans of Pakistani Banking Sector. International Letters of Social and Humanistic Sciences, 2, 192-213.

Hansen, L. (1982). Large sample properties of generalized method of moments estimators. Econometrical 50(3): 1029–1054.

Hansen, L. P. (2001). Generalized method of moments estimation: a time series perspective. International Encyclopedia of Social and Behavioral Sciences, 9743-9751.

Henry, J., Kok, C., Amzallag, A., Baudino, P., Cabral, I., Grodzicki, M., ... & Pancaro, C. (2013). A macro stress testing framework for assessing systemic risks in the banking sector.

Ikram, A. Qin Su, Ijaz, F. and Fiaz, M. (2016) "Determinants Of Non-Performing Loans: An Empirical Investigation Of Bank-Specific Microeconomic Factors, The Journal of Applied Business Research –Volume 32, Number 6.

Jameel, K. (2014). Crucial factors of nonperforming loans evidence from Pakistani banking sector. International Journal of Scientific & Engineering Research, 5(7).

Jeong, S., Jung, H. (2013). Bank Wholesale Funding and Credit Procyclicality: Evidence from Korea. Panoeconomicus, 60(5), 615–631, http://dx.doi.org/10.2298/pan1305615j

Jovovic, J. (2014). Determinants of Non-Performing Loans: Econometric Evidence Based on 25 Countries. Master Thesis, City University London.

Klein, N. (2013). "Non-performing loans in CESEE: determinants and impact on macro-economic performance", IMF Working paper, WP/13/72.

Konstantakis, K. N., Michaelides, P. G., & Vouldis, A. T. (2016). Nonperforming loans (NPLs) in a crisis economy: Long-run equilibrium analysis with a real time VEC model for Greece (2001–2015). Physica A: Statistical Mechanics and its Applications, 451, 149-161.

Kurumi, L., Bushpepa, O. (2017). Do macroeconomic variables affect the level of non-performing loans? Sixth Conference of Students of the Agricultural University of Tirana. Tiranahttps://drive.google.com/file/d/0B0H5Y5y03xiZdlFxbDE5UjZqMk0/view.

Lanne , M. & Saikkonen, P. (2009). GMM Estimation with Noncausal Instruments, HECER Discussion Paper No. 274

Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. Journal of Banking & Finance, 36(4), 1012-1027.

Manove, M., Padilla, J., A., Pagano, M. (2001). Collateral versus Project Screening: A Model of Lazy Banks. RAND Journal of Economics, 32(4), 726–744, http://dx.doi.org/10.2307/2696390.

Mazreku, I., Morina, F., Misiri, V., Spiteri, J. V, and Grima, S. (2018). "Determinants of the Level of Non-Performing Loans in Commercial Banks of Transition Countries", European Research Studies Journal, vol. 0(3), pages 3-13.

Messai, A. S., & Jouini, F. (2013). Micro and macro determinants of non-performing loans. International journal of economics and financial issues, 3(4), 852-860.

Michael, J. C., William, E. J., & Gary, A. P. (2001). "Evidence of Predictability in the Cross-Section of Bank Stock Returns". Journal of Banking and Finance, Vol 27,817-850.

Mondal, T. (2016). Sensitivity of non-performing loan to macroeconomic variables: empirical evidence from banking industry of Bangladesh. Global Journal of Management and Business Research.

Nikolaidou, E. and Vogiazas, S. (2012). "Credit Risk in the Romanian banking system: Empirical Evidence from an ARDL Model, in Karassavoglou, A. & Polychronidou, P. (eds)", Balkan and Eastern European Countries in the midst of the Global Economic Crisis. Contributions to Economics, Germany, Springer-Verlag Berlin, pp.87-101

Salas, V., Saurina, J. (2002), Credit risk in two institutional regimes: Spanish commercial and savings banks. Journal of Financial Services Research, 22(3), 203-224

Souza, G. J. D. G., & Feijó, C. A. (2011). Credit risk and macroeconomic interactions: Empirical evidence from the Brazilian banking system. Modern Economy, 2(05), 910.

Thalassinos, I.E., Stamatopoulos, D.T. and Thalassinos, E.P.(2015). The European Sovereign Debt Crisis and the Role of Credit Swaps. Chapter book in The WSPC Handbook of Futures Markets (eds) W. T. Ziemba and A.G. Malliaris, in memory of Late Milton Miller (Nobel 1990) World Scientific Handbook in Financial Economic Series Vol. 5, Chapter 20, pp. 605-639, ISBN: 978-981-4566-91-9, (doi: 10.1142/9789814566926_0020).

Waemustafa, W., & Sukri, S. (2015). Bank specific and macroeconomics dynamic determinants of credit risk in Islamic banks and conventional banks. International Journal of Economics and Financial Issues, 5(2), 476-481.