БАНКЛАРДА КРЕДИТ РИСКЛАРИ ВА УЛАРНИНГ ЭКОНОМЕТРИК ТАҲЛИЛИ

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Abstract:. Мақолада тижорат банкларида кредит рискларининг мазмун моҳияти, кредит рискларини бошқариш мақсад вазифалари, кредит рискларини юзага келиш сабаблари ва бошқариш босқичлари, кредит рискини аниқлаш (идентификациялаш) ва баҳолаш усуллари, кредит рисклари мониторинги, муаммоли кредитларининг эконометрик таҳлили келтирилган. Шу билан бирга банкларда кредит рискларини баҳолаш ва бошқариш бўйича илмий адабиётларда маҳаллий ва хорижий олимларнинг фикрлари таҳлил қилинган. Шунингдек юзага келиши мумкин бўлган кредит рискларини камайтириш бўйича илмий таклиф ва хулосалар берилган.

Keywords: кредит риски, кредит портфели, муаммоли кредит(NPL), дефолт, стандарт кредит, рискни баҳолаш.

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КРЕДИТНЫЕ РИСКИ В БАНКАХ И ИХ ЭКОНОМЕТРИЧЕСКИЙ АНАЛИЗ

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Abstract:. В статье представлены сущность кредитных рисков в коммерческих банках, задачи управления кредитным риском, причины и этапы управления кредитным риском, методы выявления (идентификации) и оценки кредитного риска, мониторинг кредитного риска, эконометрический анализ проблемных кредитов. В то же время в научной литературе были проанализированы мнения отечественных и зарубежных ученых по вопросам оценки и управления кредитным риском в банках. Также приведены научные предложения и выводы по снижению возможных кредитных рисков.

Keywords: кредитный риск, кредитный портфель, проблемный кредит (NPL), дефолт, стандартный кредит, оценка риска.

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CREDIT RISKS IN BANKS AND THEIR ECONOMETRIC ANALYSIS

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Abstract:. The article presents the essence of credit risks in commercial banks, the objectives of credit risk management, the causes and stages of credit risk management, credit risk identification (identification) and assessment methods, credit risk monitoring, and econometric analysis of problem loans. At the same time, the opinions of local and foreign scientists were analyzed in the scientific literature on credit risk assessment and management in banks. Scientific proposals and conclusions on reducing possible credit risks are also given.

Keywords: credit risk, loan portfolio, problem credit (NPL), default, standard credit, risk assessment.

Introduction

To provide financial stability of banks as well as to protect benefit of depositor and creditor bank and banking group must comply with prudential standards which set by Center bank [1]. Most of the prudential standards are related to credit risk, so that reliable system of assessment and management of credit risk should be implemented

Improving the quality of credit portfolio and risk management in the Republic of Uzbekistan as the main direction of the reform of the banking sector, following the moderate growth of lending volume, conducting a balanced macroeconomic policy, ensuring the financial stability of the banking system by implementing technological solutions for assessing financial risks [2] and preventing credit risk in banks it will be necessary to develop methods of assessment and management.

The credit activity of any bank, unlike any other institution, is one of the leading criteria. Looking at world practice, we can conclude that a large part of the bank's profit is related to lending. However, non-repayment of loans, especially large loans, can lead to bank bankruptcy. This affects the economy and leads to the bankruptcy of a number of enterprises, banks and individuals. Thus, credit risk management is one of the important parts of the development of any commercial bank. In books on foreign and domestic economic literature, much attention is paid to credit risk [3].

The socio-economic development of the country and the level of development of the legal framework have a great impact on the level of credit risk [4].

The actual problem of credit risks for banks is that, in the presence of credit risk, the creditor (bank) lacks confidence in the borrower's ability to fulfill the terms of the loan agreement and his obligations at the specified time. It is known that the profit in banking practice consists mainly of interest on loans. A decrease in the bank's profit as a result of non-payment of the interest rate or principal amount of the loan on the loans received by the borrower leads to a decrease in the weight of the bank's future funds. Therefore, lenders try to reduce the risks associated with the return of the funds they provide[5].

In general, the main bank`s income source taken from credit activity so this situation encourages increasing amount of lending, if credit risks coming from the

credits are not prevented and managed on time the biggest losses either will be arise in this direction. Especially, credit risk manifests as problem loans

In this regard, it is required to conduct scientific research from theoretical and practical aspects in terms of assessment and management credit risk.

ANALYSIS OF LITERATURE ON THE SUBJECT

Granaturov tariffed that credit risk is nonpayment risk of loan, which means that nonpayment principal and interest debt by borrower according with loan agreement [6].

Basel interprets credit risk is that nonpayment probability of borrower or counterparty in accordance with terms of contract [7].

Lavrushin defines credit risk is as that non fulfilment by third person commitment of credit in front of lender [8].

Korshunova N.I interprets credit risk is that losses of bank due to non-fulfilment financial covenants of credit organization by borrower timely or fully credit risk of banks relate to internal and external factors although bank mitigating impact of risks and deterring huge financial losses, managing external factors depend on political, economic and market condition is very difficult [9].

In according with procedure named "demands on risk management of commercial banks" of central bank, credit risk is that risk link with arising financial losses due to non fulfilment partly or fully financial obligation by borrower in front of bank design in contract [10].

If we review special, local, and foreign literature they connect problem assets with loans and they interpret them with concepts such as "problem asset", "problem loan", "non-performing loan".

Problem loans is that result of obvious manifestation of credit risk in practice, that`s it is considered ramification of not managing credit risks properly [11]. Arising of credit risk cause non-fulfilment principal and interest loan on time.

Considering the above, we can define credit risk is that as "arising probability losses due to non fulfilment obligation according to terms of financial contract by borrower".

METODOLOGY OF RESERCH

In the article given content of credit risk, purpose, and tasks of credit risk management, causes and management stages of credit risk, econometrical analysis of nonperformance loans, independent approach was shaped based on conclusion of scientific research carried out by local and foreign scientist and practical experience of researcher according to pay attention essential aspects to analysis. Also, method such as schedule, analytical comparison, logical analysis, grouping, and statistic information were broad used in the article.

ANALAYSIS AND RESULTS

Object of assessment credit risk should be clear, so, based on reliable information, conclusion and recommendations on improving quality of credit portfolio should be given based on analytical calculations

Credit risks management are based on the following principle:

Comprehensive nature of assessment – it is necessary to cover all aspects associated with credit activity to mark real level of credit risk in bank and to develop necessary measures.

In case of complex assessment credit risk should harmonize quality, indicators which considered during individual interview along with financial performance of borrower.

Enough reaction – risk factor assessment in past period and forecasting their future impacts should be implemented rapidly. Essence of the principles means that leading to the rise on credit risk, reactive to external and internal changes quickly, and use necessary methods.

Basing on those principles, the most basic goal of credit risk management is that achieve enhancing quality credit portfolio through minimize risk level.

To goal of credit risk management in bank is achieved on the basis of a systematic and complex approach in terms of following tasks solution:

Taking operative and objective information about status and amount of credit risk; credit risk assessment in terms of quality and quantity; establishing correlation among individual risk types to score planning measure according to limit influence of risk types to enhancing or reducing of other risk types of level; credit risk management in step of arising negative tends as well creating quick action system focused on deterring of credit risk to reach critic level of credit risk.

Risk level of credit portfolio in bank can identify as follows:

$$\text{K}_p = \frac{\text{K}_1 + \text{K}_2}{2} = \frac{\text{K}_1 + \text{K}_{21} + \text{K}_{22} + \text{K}_{23} + \text{K}_{24}}{2},$$

Here,

K1 – variability of credit portfolio risk;

K2 – the share of non-standard loans in the total amount of allocated loans;

K21 – the share of substandard loans in credit portfolio;

K22 – the share of dissatisfaction loans the total credit portfolio;

K23 – the share of doubtful loans in total credit portfolio;

K24 – the share of hopeless loans in total credit portfolio.

One of the first indicators that categorize the quality of the credit portfolio is that the share of substandard loans in total credit portfolio:

$$\text{K}21 = \frac{\text{Substandard loans}}{\text{Credit portfolio of bank}} \times 100$$

The coefficient warns to bank about increasing necessity control efficiency under financial performance of borrowers that getting worse credit quality.

The next step of calculating the share of delinquent loans in credit portfolio is that determining the share of dissatisfaction loans in total credit portfolio:

$$К22 = \frac{\text{dissatisfaction loans}}{\text{Credit portfolio}} \times 100$$

It is important to control the volume of credit operations with clients experiencing inherent difficulties. Therefore, it is necessary to determine the share of doubtful loans in credit portfolio.

$$К23 = \frac{doubtful\ loans}{\text{creidt portfolio}} \times 100$$

The share of hopeless influent to quality of credit portfolio.

$$К24 = \frac{hopeless\ loans}{credit\ portfolio} \times 100$$

We try learning econometric analysis of factors which influence to non-performance loans.

Information of 9 countries were used in the econometric analysis. Particularly: Uzbekistan, Russia federation, Kazakhstan, Kyrgyzstan, |Belarus, Azerbaijan, Moldavia, Tajikistan.

Econometric analysis was carried out using following macroeconomic and inherent to banking system total 12 indicators between 2011 and 2020 period of countries above. (Appendix 1):

Table 3.2

Indicators used in econometric analysis [134]

№	Indicators	Short form
	Financial (related to bank)	
1.	Problem loans	NPL
2.	Adequate capital	CAR
3.	Interest spread	IS
4.	Deposit to loan ratio	LDR
5.	Return on average assets	ROA
6.	Huge banks (*Assets of huge 5 banks to total assets ratio*)	TBTF
7.	Operational efficiency	CIR
8.	Liquid ratio	Liquid
Macroeconomical		
9.	Gross domestic products	GDP
10.	Inflation	IR
11.	Remittance	RE
12.	Unemployment	UNEM

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[134] It is compiled by the author

We consider following problem loans connection with interest rate spread and huge banks:
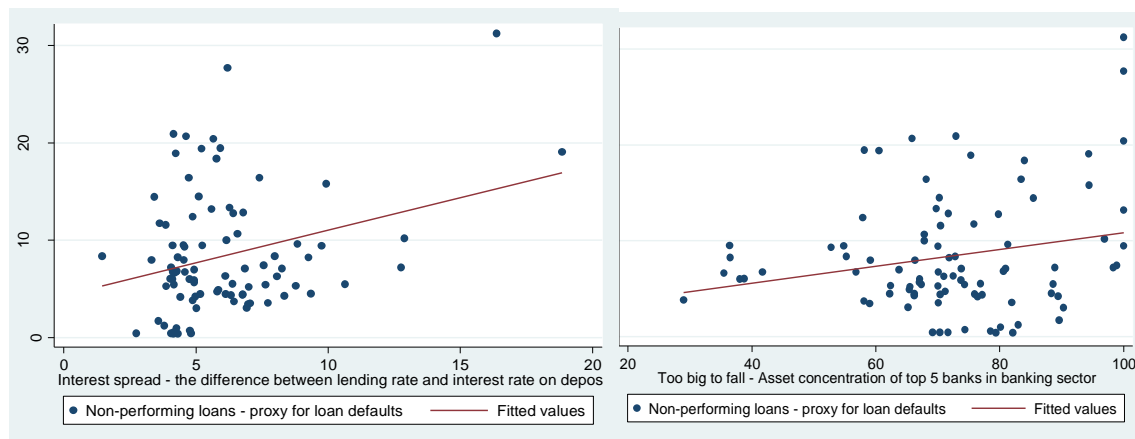
Picture 3.2 Relationship of problem loans with interest rate spread and huge banks[135]

Here problem loans are vertical the rest indicators located horizontally. It is clear from the graphics there are relationship among those indicators.

We can see location of chosen indicators of countries between chosen period in the figure:
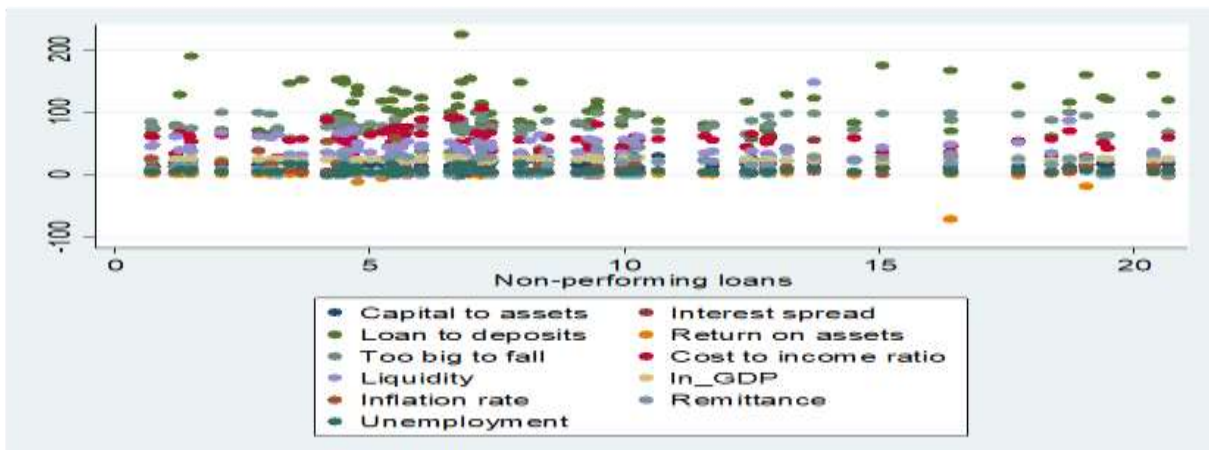
Picture 3.3. Location of chosen indicators of countries according to problem loans between selected period[136]

So, it is clear from the information of the picture that the indicators are not very scattered.

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[135] It is compiled by the author
[136] It is compiled by the author

We can see fluctuation interval of selected indicators for 10 years in this
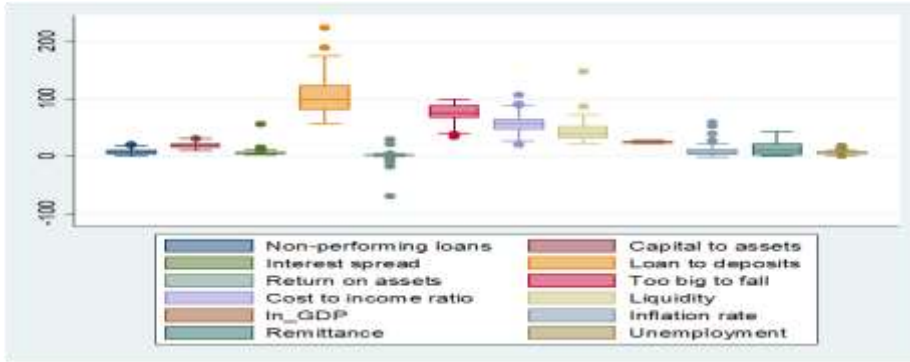
picture.

Picture 3.4. Fluctuation interval of countries` selected indicators in terms of problem loans[137]

It can be seen from the picture that the biggest fluctuation is loans to deposit ratio.

In the diagram, we can see which indicator how repetition rank of selected indicators among 10 years:

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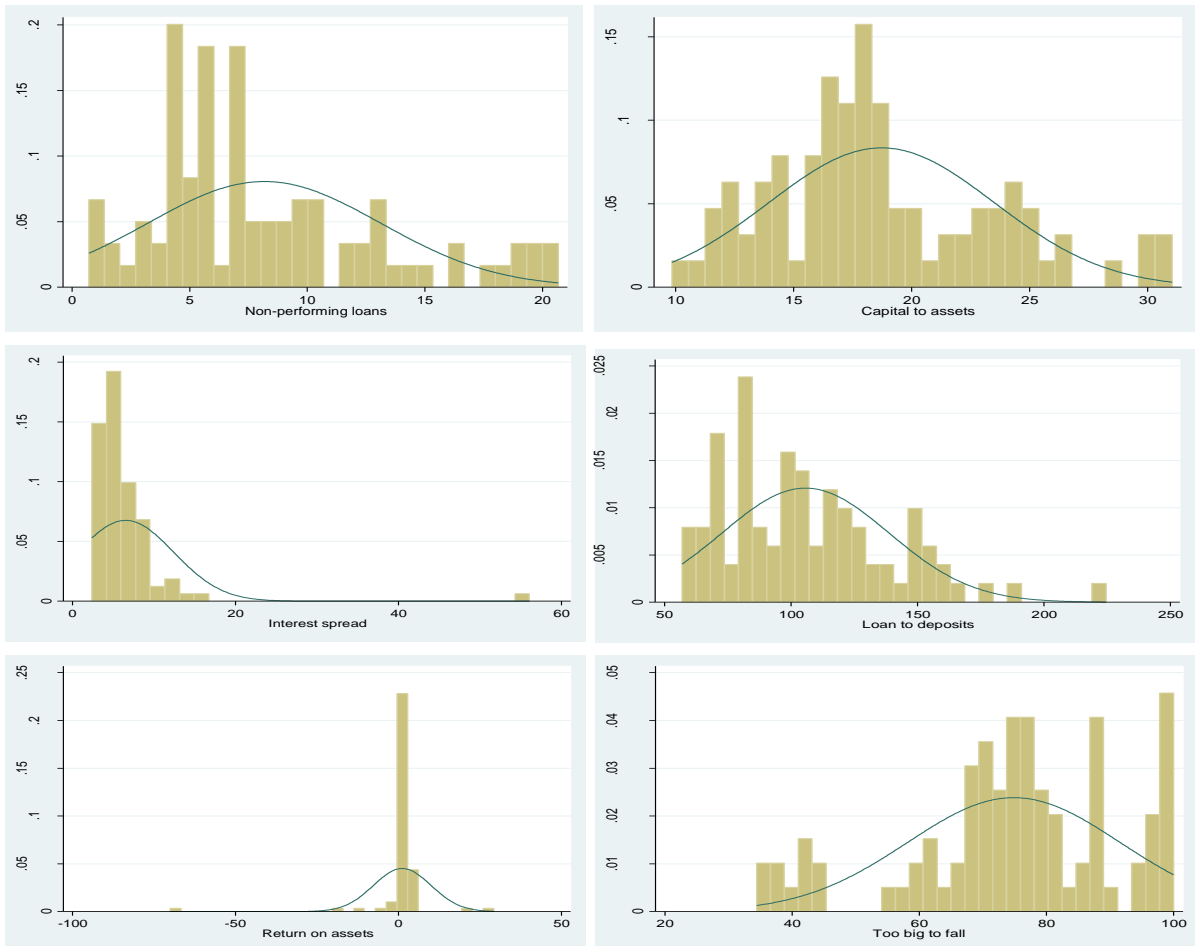
[137] It is compiled by the author
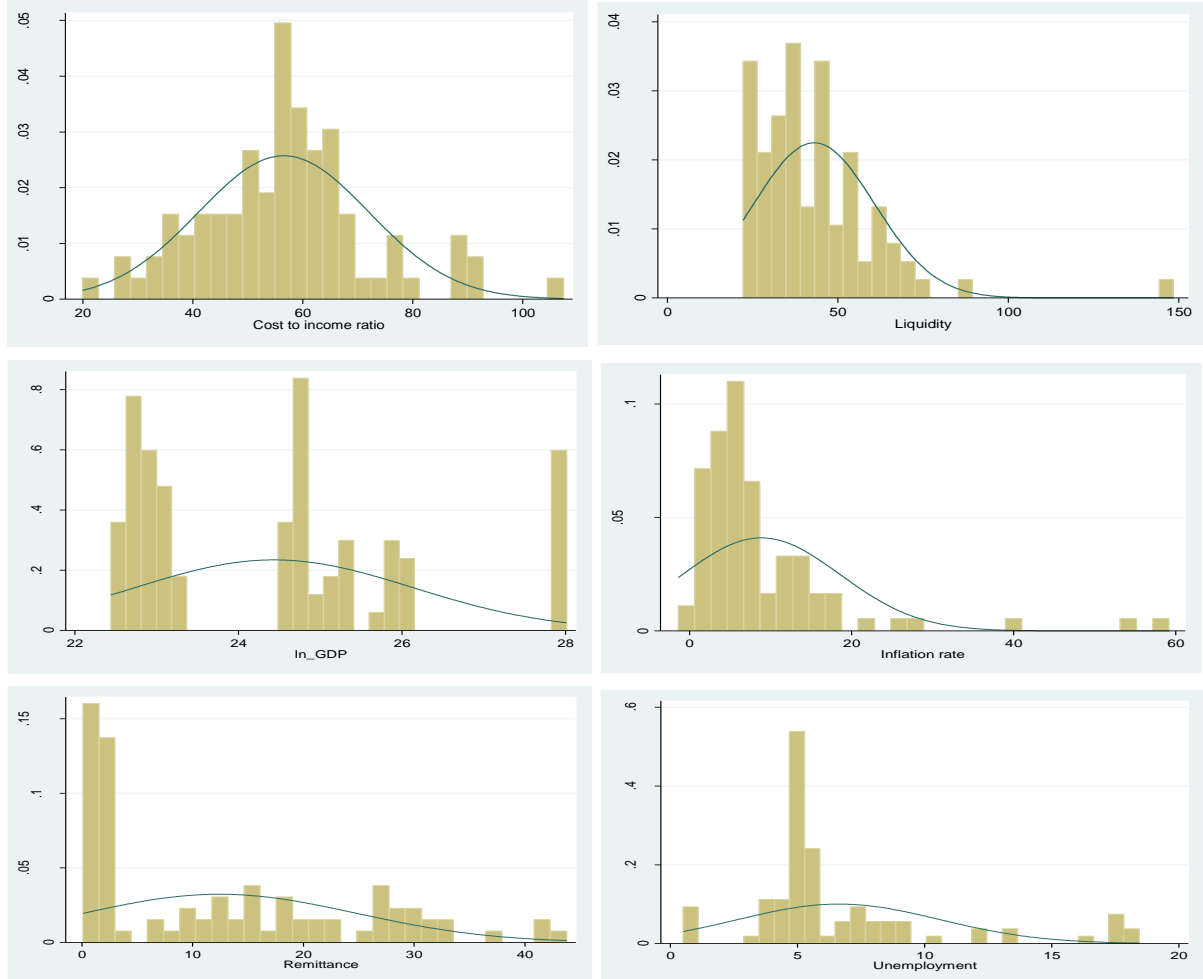
Picture 3.5. Repetition rank of selected indicators in terms of problem loans[138]

In this table (appendix 2) illustrated brief content of used factors in the econometric analysis:

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[138] It is compiled by the author

Variable		Mean	Std. Dev.	Min	Max	Observations	
id	overall	5	2.596454	1	9	N =	90
	between		2.738613	1	9	n =	9
	within		0	5	5	T =	10
year	overall	2015.5	2.888373	2011	2020	N =	90
	between		0	2015.5	2015.5	n =	9
	within		2.888373	2011	2020	T =	10
NPL	overall	8.168349	4.948828	.70919	20.6655	N =	90
	between		4.145917	2.165688	15.09102	n =	9
	within		3.006734	-.0966681	17.37141	T =	10
CAR	overall	18.73002	4.780696	9.8496	31.0306	N =	90
	between		3.588426	12.82462	25.01574	n =	9
	within		3.358631	7.632284	28.2449	T =	10
IS	overall	6.514356	5.898556	2.382469	56.10839	N =	90
	between		3.33377	3.526276	14.20229	n =	9
	within		4.980244	-4.157943	48.42046	T =	10
LDR	overall	105.718	33.0377	56.84948	224.6165	N =	90
	between		24.93186	71.83729	141.7275	n =	9
	within		23.08139	66.14643	226.1988	T =	10
ROA	overall	1.180013	8.84859	-69.99384	29.34206	N =	90
	between		1.709108	-2.864942	2.919602	n =	9
	within		8.698959	-65.94889	33.38701	T =	10
TBTF	overall	74.88142	16.73721	34.40302	100	N =	90
	between		16.08	40.03943	98.15892	n =	9
	within		6.90759	58.95836	93.03177	T =	10
CIR	overall	56.53548	15.50452	19.92333	107.4037	N =	90
	between		7.890985	41.55789	67.95583	n =	9
	within		13.58011	25.23021	112.7106	T =	10
Liquid	overall	43.05299	17.74615	22.15471	148.5011	N =	90
	between		9.188763	31.45202	54.03311	n =	9
	within		15.46062	11.98762	138.334	T =	10
ln_GDP	overall	24.43413	1.700534	22.44103	28.01052	N =	90
	between		1.789837	22.62547	27.95754	n =	9
	within		.1106814	24.13011	24.72013	T =	10
IR	overall	8.858852	9.724761	-1.403608	59.21974	N =	90
	between		5.954977	2.745176	19.63018	n =	9
	within		7.918033	-5.899022	48.44841	T =	10
RE	overall	12.44481	12.32786	.0932936	43.76805	N =	90
	between		12.62181	.2173944	33.13326	n =	9
	within		2.962463	5.998969	23.0796	T =	10
UNEM	overall	6.626988	3.982427	.5	18.44	N =	90
	between		3.814556	2.756	16.059	n =	9
	within		1.667429	2.747988	12.1484	T =	10

We can see from the picture mean value, median, maximum, and minimum value of each factor. Furthermore, it is shown that standard deviation, standard deviation coefficient how much deviated from each medium value of each deviation.

In the table matrix of correlation coefficient was given among factors.

Table 3.3

Matrix of correlation coefficient among factors influenced to problem loans[139]

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[139] It is compiled by the author

	NPL	CAR	IS	LDR	ROA	TBTF	CIR	Liquid	ln_GDP	IR	RE	UNEM
NPL	1.0000											
CAR	-0.0184	1.0000										
IS	0.2742	-0.0690	1.0000									
LDR	0.1192	-0.3364	0.1300	1.0000								
ROA	-0.1205	0.1015	0.1919	-0.1899	1.0000							
TBTF	0.1856	0.3572	0.2884	-0.0946	-0.0677	1.0000						
CIR	-0.2587	0.1063	-0.2973	-0.1610	0.0148	-0.1695	1.0000					
Liquid	-0.0990	-0.2692	0.5403	-0.0609	0.2306	0.0373	-0.1651	1.0000				
ln_GDP	-0.1586	-0.4763	-0.2702	-0.1024	0.0441	-0.6520	0.0005	0.1420	1.0000			
IR	-0.2081	0.1433	-0.0589	-0.2068	-0.0103	0.2648	0.1689	-0.0386	0.0993	1.0000		
RE	0.2447	0.3316	0.3420	0.2189	-0.0634	0.5249	0.1151	0.0515	-0.7859	-0.0949	1.0000	
UNEM	-0.0570	-0.1418	0.1036	0.5072	0.0192	-0.0816	-0.1014	0.0580	-0.3368	-0.3759	0.2934	1.0000

So, we can see correlation rank of problem loans with interest rate spread is higher than other factors in the table.

In the table given initial regression results of multifactors econometric model on problem loans.

Table 3.4

Initial regression results of multifactor econometric model according to problem loans[140]

VARIABLES	(1) Pooled OLS	(2) Population-averaged	(3) Between Estimator	(4) Fixed	(5) Random
CAR	-0.121	-0.0888	-2.666	-0.0923	-0.121
IS	0.294***	0.0306	-0.0281	-0.0466	0.294***
LDR	-0.00700	0.0351**	-0.360	0.0600***	-0.00700
ROA	-0.0344	0.00735		0.0163	-0.0344
TBTF	0.0410	0.0222	0.356	0.0101	0.0410
CIR	-0.0703*	-0.0332	-0.268	-0.0377	-0.0703**
Liquid	-0.117***	-0.0406	-0.0870	0.00353	-0.117***
ln_GDP	0.977	-2.473*		-13.40***	0.977
IR	-0.131**	-0.0339	-1.125	-0.0715	-0.131**
RE	0.176**	-0.285***	0.268	-0.476***	0.176**
UNEM	-0.228	0.178		0.164	-0.228
Constant	-8.140	70.98**	95.27	338.0***	-8.140
	(19.44)	(32.65)	(0)	(97.07)	(19.44)
Observations	90	90	90	90	90
R-squared	0.342		1.000	0.376	
Number of id		9	9	9	9

We receive from the table big "fixed" column which "R-squared" was big.

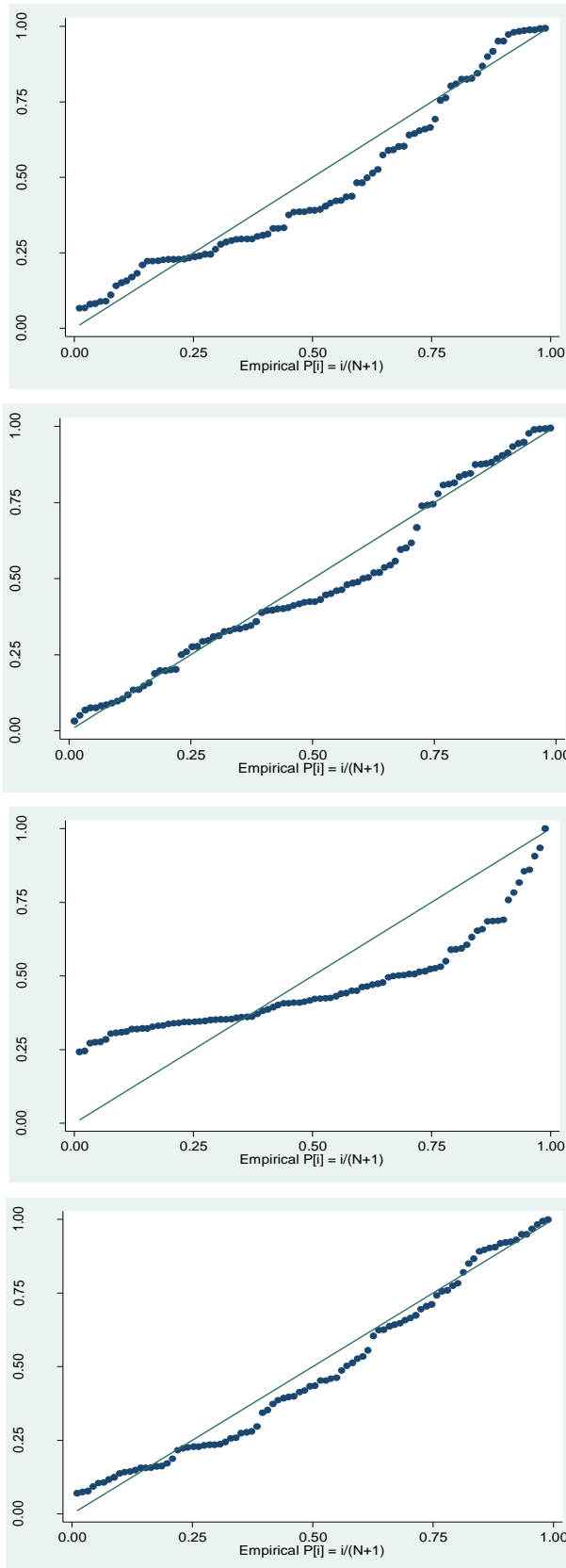Here * mark means that high impact of those factors on problem loans.

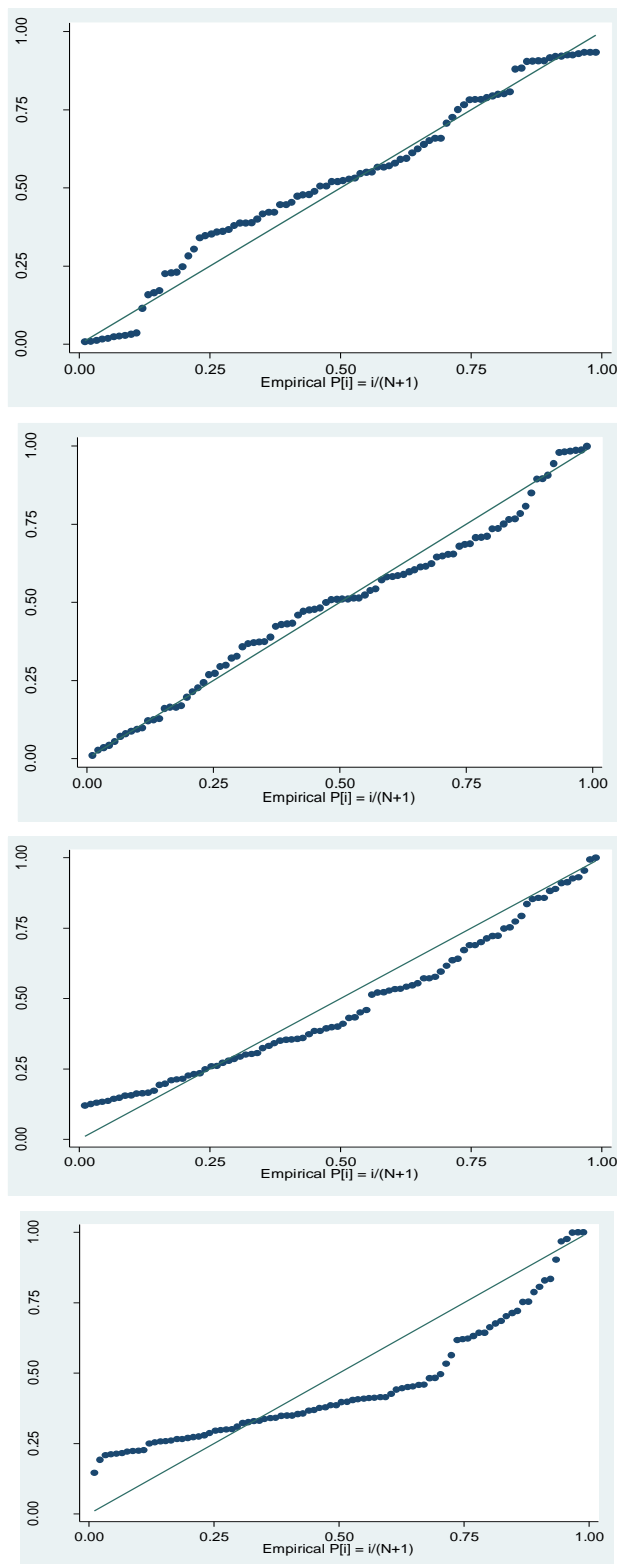In the given diagrams we can see location points of factors around one arrow.

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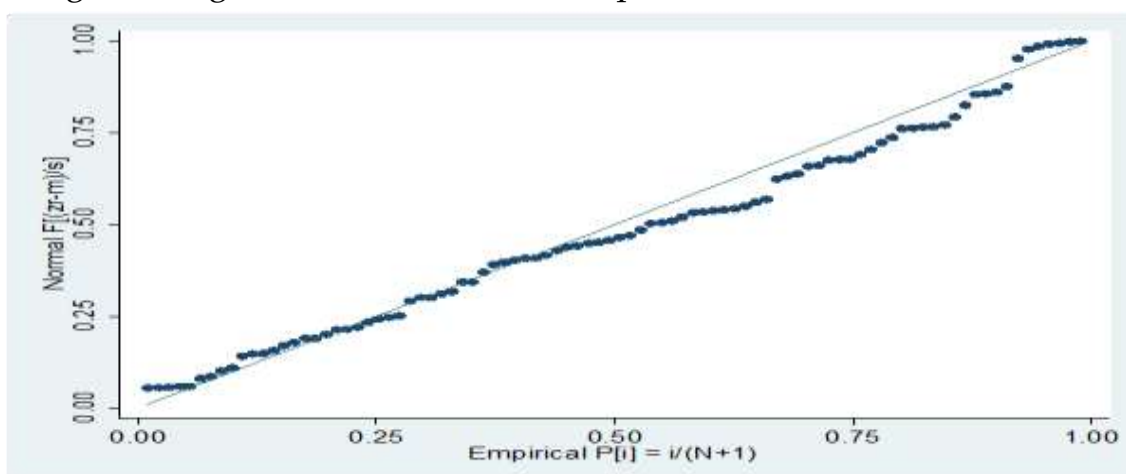
[140] It is compiled by the author

Picture 3.6. Repetition rank of countries` chosen indicators on problem loans[141]

In the picture, we can see normal location of factors. We review location of each factor.

Picture 3.7. Location of countries` chosen indicators according to problem loans[142]

In the table, we can see final results of regression analysis in three model. So, factors in the first model consider as indicators related to bank activity while factors

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[142] It is compiled by Author

in the second model consider as macroeconomic indicators. In the third model combined effect of the first and second is considered as studied result.

Table 3.5

Results of regression analysis according to problem loans[143]

VARIABLES	MODEL 1	MODEL 2	MODEL 3
CAR	**-0.167*** (0.157)		-0.121 (0.227)
IS	**0.0873*** (0.110)		**0.294*** (0.162)
LDR	0.0258 (0.0187)		-0.00700 (0.0240)
ROA	-0.00117 (0.0103)		-0.0344 (0.0378)
TBTF	**0.0428*** (0.0359)		**0.0410*** (0.0733)
CIR	-0.0407 (0.0334)		**-0.0703*** (0.0296)
Liquid	**-0.0488*** (0.0281)		**-0.117*** (0.0449)
ln_GDP		-1.904 (1.210)	0.977 (0.720)
IR		**-0.0680*** (0.0278)**	**-0.131*** (0.0721)
RE		**-0.220*** (0.0730)	**0.176*** (0.0942)
UNEM		**0.122*** (0.183)	**-0.228*** (0.177)
Constant	**9.195*** (3.282)	**57.22*** (31.30)	-8.140 (21.37)
Observations	90	90	90
R-squared	0.3423	0.3913	0.7599
Number of countries	9	9	9

We can write follow formula using the information from the table:

Model 1: NPL = **9.195 - 0.167 * CAR + 0.0873 * IS** + 0.0258 * LDR - 0.00117 * ROA + **0.0428 * TBTF** - 0.0407 * CIR - **0.0488 * Liquid**

Model 2: NPL = 57.22 - 1.904 * ln_GDP + **0.0680 * IR – 0.220 * RE + 0.122 * UNEM**

Model 3: NPL = - 8.140 - 0.121 * CAR + **0.294 * IS** - 0.007 * LDR - 0.0344 * ROA + **0.0410 * TBTF - 0.0703 * CIR - 0.117 * Liquid** + 0.977 * ln_GDP - **0.131 * IR + 0.176 * RE - 0.228 * UNEM**

As mentioned above, which indicator has * mark is considered high connection with problem loans.

Including, capital adequacy ratio (**CAR**) in the first model is -0.167, with 90 percent accuracy shown inverse relationship that is while capital adequacy ratio declines 1 percent, actually, it came from increasing problem loans approximately 0.17 percent. If we analyze it logically, first of all, increasing problem loans leads

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[143] It is compiled by Author

growing risk weight assets secondly forming reserve for problem loans causes reducing capital.

Similarly, if we study the interest spread (IS), it shows that the credit risk is taken into account when setting the interest rate on the loan, and the probability of the occurrence of problem loans increases due to the high rate of these loans becoming problem or high interest loans. Here, (IS) is correctly associated with NPLs with 95% certainty (p-value < 0.05), whereas a 1% (not % point) widening of the spread leads to a 0.09% increase in NPLs.

Also, the analysis shows that the larger the contribution (TBTF) of the 5 largest banks (in total assets) in the banking system, the more problem loans there are. At the same time, the increase in problem loans and the creation of a reserve for them will reduce the bank's operating income, that is, it will lead to a decrease in the CIR indicator. Returning the resource source of problem loans at the expense of liquid assets leads to a decrease in the bank's liquidity indicators.

Taking macroeconomic indicators, the result of the analysis shows that the higher the inflation rate (IR), the lower the level of non-performing loans to a certain extent, that is, a higher inflation rate reduces the debt burden by lowering the real value of the loan. In addition, we can see that the increase in the unemployment rate (UNEM) is directly proportional to the volume of bad loans. A decrease in remittances (RE) leads to an increase in non-performing loans. In general, these two indicators are logically related to problem loans with 95% accuracy (p-value < 0.05), because both indicators reflect the profitability of debtors.

CONCLUSION AND SUGGESTIONS

Main direction of regulation credit risk is to deter credit risks or should develop measure and carry out according to minimize losses related to credit risks.

Minimizing credit risk is necessary to reduce probability of arising circumstance and cases leading losses on credits, and to carry out complex measure according to bordering potential losses.

In order to limit credit risks of bank on types of economic activity, to finance investing projects should be set limit according to regional boundaries, maximal term of disbursement loans on types of economic activity, balance sheet and balance sheet off credit portfolio ratio.

Productive way of reducing risk rank according to credit portfolio for banks is considered creating reserve. The current method is focused on defending quality of credit portfolio and confidence in bank together with depositor, borrower, shareholder. Reserve is created to deter loss due to non-fulfillment obligation because of non-capable payment of borrower.

Credit risk management Approving credit and risk appetite policies to the Bank Supervisory Board, as well as making changes and additions to them; ensuring the creation of the bank's organizational structure in accordance with the main principles of credit risk management; control of activities of bank executive bodies on credit risk management; Making a decision on allocating loans to debtors above the bank management limit; Review of the credit risk management report submitted by the bank's management should be given authority and duties.

Reviewing and approving the bank's management internal regulatory documents and their amendments defining the rules and procedures for credit risk management (statutes, procedures, rules, methodologies, regulations, tariffs, etc.), distribution of authority and responsibility for credit risk management among heads of departments at different levels , it is necessary to provide them with the necessary resources, establish the procedure for interaction and reporting, and give them powers and duties.

Development of internal documents related to the credit risk management system for the bank's risk management department; coordination of internal documents of the bank on issues related to credit risk management; supervises credit risks and informs bank management bodies about its results; identify credit risks, assess them and analyze them; providing methodological instructions and proposals for determining and evaluating the level of credit risk; analyzes the credit risk management system (risk audit, self-assessment) and develops proposals for its improvement, taking into account advanced international experience and standards; it is necessary to attach powers and duties, such as issuing technical assignments on the formation of the credit risk management automation system and monitoring its implementation.

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