International Journal on Emerging Technologies **10**(2a): 91-95(2019)

ISSN No. (Print): 0975-8364
ISSN No. (Online): 2249-3255

Formation of a Method for Determination of a Commercial Credit Bank Rating

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Received 05 May 2019, Revised 16 July 2019 Accepted 25 July 2019)

(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The paper discusses the issue of forming a methodology for determining a credit rating for commercial banks through an integrated assessment method. The necessity of including a system of quantitative indicators characterizing capital, asset quality, quality of attracted funds, organization management, risk exposure, profitability and liquidity of the bank, as well as a system of other quality indicators (indicator of sales points, development of the bank's territorial network by type of its structural divisions, bank status) is substantiated. The system of indicators included in the proposed method for determining a credit rating for commercial banks was formed based on an analysis of economic literature, testing factors for multicollinearity, as well as through one-dimensional analysis of variance. This methodology was tested on the example of 5 Russian banks (LLC Kamcom bank, JSC Raiffeisen bank, JSC AKB Tender-Bank, PJSC Sovcom bank, and JSC Gazprom bank), the results of the calculations reflected the current situation in the banking market, which confirms the possibility of its application in practice. It was also determined that, given the current economic conditions, it would be easier for large banks to "get" a credit rating using quality indicators, while small and medium-sized credit organizations should focus on quantitative indicators.

Keywords: banking sector, credit rating, credit rating agencies, credit rating assessment methodology, credit organization.

I. INTRODUCTION

In the modern conditions of consolidation and concentration of the banking system, toughening the requirements of the Central Bank of the Russian Federation to ensure the transparency of credit institutions, and increasing competition in the banking services market, an important role in assessing the creditworthiness of credit organizations is played by ratings of commercial banks which represent an assessment of certain aspects of a credit institution. Credit ratings are compiled by both Russian (Expert RA JSC [1], ACRA JSC [2]) and foreign rating agencies, the most authoritative of which are Moody's [3], Standard & Poor's [4], Fitch Ratings [5].

At present, each rating agency is characterized by its own methodology for calculating the final rating, features of rating scales and a set of initial indicators. At the same time, it should be noted that the ratings of foreign rating agencies are similar. Russian rating agencies Expert RA JSC and ACRA JSC also give very similar ratings, but higher than foreign agencies [6]. Analysis of the existing methodological approaches of rating agencies revealed their following disadvantages:

- Ambiguous approach to the formation of a system of indicators to determine the reliability of a bank,
- Availability of subjective opinion in making judgments and assigning a rating,
- Lack of consideration of the development cycle phase of the bank when assigning a rating,
- Non-transparent work of agencies with bank statements (use of IFRS or RAS financial statements), which affects the distortion of the assessment,
- Lack of an integrated approach in determining reliability criteria, etc.

The identified shortcomings make it necessary to improve the methods of rating agencies for assessing the financial stability of credit institutions to obtain an effective tool for making managerial decisions.

II. METHODS

The methodological basis of the study was the works of foreign and domestic scientists on the formation of credit ratings of commercial banks [7-11] and their influence on various aspects of the bank activity [12-14]. Particular attention is paid to the comparison of rating scales, the study of default models [15, 16], as well as their monitoring systems. However, in our opinion, despite a large number of studies on this topic, the issue of forming ratings is not sufficiently developed and requires additional research.

The main methods of this study were: the integral assessment method, point-weighting method, analysis of economic literature, correlation analysis and one-dimensional analysis of variance.

III. RESULTS AND DISCUSSION

In order to formulate a methodology for determining the credit rating of a bank by calculating an integral indicator, the following research stages were outlined:

(1) To optimize the composition of quantitative indicators within 7 blocks characterizing the activities of a credit institution: capital, asset quality, quality of funds raised, management/control, risk exposure, returns/profitability and liquidity;

(2) To form a system of quality indicators (3 blocks) which included the availability of bank representative offices in the regions (indicator of sales points), the development of the bank's territorial network by type of its structural subdivisions, bank status (systemically important bank, participant of the deposit insurance system, bank insurance agent);
(3) To determine the weights of qualitative and quantitative indicators for the blocks and the significance of each indicator within the blocks;
(4) To form a model of the integral indicator of the bank credit rating of the.
As a result, the formula of a bank credit rating (KR) can be represented as follows:

$$KR = I_{quant.} + I_{qual.} \quad (1)$$

where KR is the bank credit rating;

P_{quant} . - quantitative indicators (7 blocks of factors);
$P_{Qual.}$ - quality indicators (3 sets of factors).
Based on the analysis of economic literature, testing factors for multicollinearity and through one-dimensional analysis of variance, a system of quantitative indicators was formed, which is included in the model (1) and presented in Table 1.

As a result, the formula for calculating the parameter $I_{quant.}$ in the formula (1) can be represented as follows:

$$I_{quant} = K + C + M + P + A + L + D \quad (2)$$

Table 2 presents the weighting factors of quantitative indicators within the framework of the relevant block determined based on the total significance of the block equal to 1.

Table 1: The system of quantitative indicators included in the credit rating assessment model.

Block name	Indicator name	Designation	Formula
Capital (K)	Capital adequacy ratio of the bank	$H_{1.0}$	The formula for calculating $H_{1.0}$ presented in the Instructions of the Bank of Russia dated June 28, 2017 No. 180-I "On the mandatory standards of banks" [17]. If the ratio value is not complied with, then the block "capital" will automatically be assigned a score equal to zero.
	Fixed asset-to-equity capital ratio	K_{KK}	$K_{kk} = \frac{K_o}{K}$ Where K_o- Fixed assets; K - Equity capital of the bank.
	Equity capital to household deposits ratio	K_{PV}	$K_{PV} = \frac{K}{V}$ Where V - household deposits.
	Availability of subordinated loans, and loans in the equity of the bank	K_{CHK}	if there is a subordinated loan, then K_{CHK}= 10, if not available, then 0
Quality of funds raised (C)	The ratio of funds raised to obligations	K_{KP}	$K_{KP} = \frac{PS}{O}$ Where PS is the amount of funds raised; O - The volume of obligations.
	Ratio of time funds raised to the total amount of funds attracted by the bank	K_{SP}	$K_{SP} = \frac{SPS}{PS}$ Where SPS - time funds raised.
	Ratio of deposit facilities to funds attracted by the bank	K_{DI}	$K_{SP} = \frac{DS}{PS}$ Where DS - deposit funds.
	Ratio of loans, deposits and other funds of the Bank of Russia to borrowed funds	K_{ZP}	$K_{ZP} = \frac{BR}{PS}$ Where BR - loans, deposits and other funds of the Bank of Russia.
Management (M)	transformation ratio of deposit sources into loan debt	K_T	$K_T = 1 - \frac{K_{VD}}{D_K}$ WhereK_{VD}-debit turnover for issuing loans; D_K-Credit turnover on receipt of funds on deposit accounts.
	coefficient of placement of funds raised	K_P	$K_p = \frac{PS}{A_D}$ WhereA_D- income generating assets
	ratio of interest income to interest expense	K_B	$K_e = \frac{PD}{PR}$ where PD - interest income; PR - interest expense.
	income to expense ratio	K_D	$K_D = \frac{D}{R}$ where D - bank earnings R - bank expenses.
Risk exposure (P)	overdue debt ratio	K_{PSZ}	$K_{PSZ} = \frac{PZ}{SZ}$ where PZ is the amount of arrears; SZ - the volume of loan debt.
	ratio of reserves for possible losses to arrears	K_{PKR}	$K_{PKR} = \frac{RVPS_{PZ}}{PZ}$ Where$RVPS_{PZ}$are provisions for possible losses on

			overdue debts
	ratio of market risks of a credit institution to risk-weighted assets	K_{CHRR}	$K_{CHRR} = \frac{PP}{A_r}$ where PP is the value of market risks; A_r- risk-weighted assets
	ratio of operational risks (with a ratio of 12.5) to assets weighted by risk level	K_{CHOR}	$K_{\text{CHOR}} = \frac{OR}{A_p}$ where OR is the amount of operational risk.
Bank earning power ratio / profitability (D)	return on assets	ROA	$\text{ROA} = \frac{\text{CHP}}{\text{A}}$ CHP - net profit; A - total bank assets
	return on equity	ROE	$\text{ROE} = \frac{\text{CHP}}{\text{K}}$
	net interest margin	NIM	$\text{NIM} = \frac{PD - PR}{A}$
	net interest spread	NIS	$NIS = \frac{PD}{SZ} * 100\ \% - \frac{PR}{PS} * 100\%$
Liquidity (L)	instant liquidity ratio	H_2	The formula for calculating $H_{1.0}$is presented in the Instructions of the Bank of Russia dated June 28, 2017 No. 180-I "On the mandatory standards of banks"[17].The standard value of H_2> = 15%
	current liquidity ratio	H_3	The formula for calculating $H_{1.0}$ is presented in the Instructions of the Bank of Russia dated June 28, 2017 No. 180-I "On the mandatory standards of banks"[17].The standard value of H_3> = 50%
	long-term liquidity ratio	H_4	The formula for calculating $H_{1.0}$ is presented in the Instructions of the Bank of Russia on June 28, 2017 No. 180-I "On the mandatory standards of banks"[17].The standard value of H_4<= 120%
Asset Quality (A)	ratio of working assets to bank assets	K_{DA}	$K_{DA} = \frac{A_{D\partial}}{A}$
	ratio of assets with increased risk to operating assets	K_{AR}	$K_{AR} = \frac{A_R}{A_D}$
	ratio of other assets to bank assets	K_{NA}	$K_{NA} = \frac{PA}{A}$ Where PA - other assets of the bank.

Table 2: Weight coefficients of quantitative indicators in a model for assessing a bank credit rating.

Block in the model	Weights of quantitative indicators in the corresponding block			
Capital (K)	$H_{1.0}$	K_{KK}	K_{PV}	K_{CHK}
	0.25	0.25	0.25	0.25
Quality of funds raised (C)	K_{DI}	K_{KP}	K_{SP}	K_{ZP}
	0.1	0.5	0.5	-0,1
Management (M)	K_T	K_P	K_B	K_D
	0.25	0.25	0.25	0.25
Risk exposure (P)	K_{PSZ}	K_{PKR}	K_{CHRR}	K_{CHOR}
	-0.9	0.1	0.9	0.9
Yield (D)	ROA	ROE	NIM	NIS
	0.25	0.25	0.25	0.25
Liquidity (L)	H_2	H_3	H_4	
	0.33	0.34	0.33	
Asset Quality (A)	K_{YES}	K_{AR}	K_{ON}	
	1.50	-0.25	-0.25	

Note: quantitative indicators are reduced to a 10-point scale.

To calculate the parameter $Q_{qual.}$, the following points should be considered in the formula (1):

(1) The indicator of the territorial cover age by the structural divisions of the bank (TO_P) is defined as the ratio of the number of regions in which the bank units are presented to the total number of regions in the country. This indicator is reduced to a 10-point scale;

(2) Sale point indicator (P_{TP}) which reflects the degree of development of the bank office network, its structural divisions, except for bank representations abroad and cash desks of an out-of-cash node. The indicator of sales points is defined as the ratio of the number of structural units of a bank and the number of regions in which the office network of a credit institution is represented. Subsequently, this indicator is also reduced to a 10-point scale;

(3) The indicator "bank status" (S) is determined by three components, namely, is the bank:

- Systemically important, if yes, then 5 points, if not - then 0 points;
- A member of the deposit insurance system (DIS), if yes, then 1 point, if not - then 0 points;
- Agent bank for insurance claims (agent bank AIC), if yes, then 4 points, if not - then 0 points.

Summing up the maximum points, you can get a value of 10 points.

A more detailed algorithm for calculating quality indicators and subsequently a bank credit rating is given in Table 3.

Table 3: Calculation of quality indicators reflecting the weights of indicators.

Indicator	Maximum score	Numerator	Denominator	"Yes"	"Not"
Territorial coverage by bank offices	10	Number of regions of the Russian Federation where the bank is represented	The number of regions in the country		
Point of Sales Indicator	10	Number of divisions of the bank's office network	The number of Russian regions where the bank is represented		
Bank status:	10			10	0
- systemically important				5	0
- DIS member				1	0
- AIC agent bank				4	0

Table 4: The system of calculating the credit rating of the bank, in points.

Name of the credit organization	I_{quant}	I_{qual}	KR
JSC "Gazprom bank"	63,3126	23,1544	86,4670
JSC Raiffeisen bank	54,4508	19,5198	73,9706
PJSC "Sovcom bank"	49,8757	14,9702	64,8459
JSC JSCB Tender Bank	29,8608	2,1176	31,9784
Kamcom bank LLC	35,0154	5.9706	40.9860
The maximum possible number of points	70.00	30.00	100.00

As a result, the formula for calculating the parameter I_{qual} in (1) can be represented as follows:

$$I_{qual} = TO_P + P_{TP} + S \quad (3)$$

The proposed credit rating model was tested by the example of 5 banks: LLC Kamcom bank, JSC Raiffeisen bank, JSC AKB Tender-Bank, PJSC Sovcom bank, JSC Gazprom bank. The results of the calculations are presented in Table 4.

According to this methodology, Gazprom bank JSC has the highest credit rating, followed by Raiffeisen bank JSC, Sovcombank PJSC, Kamcom bank LLC and JSCB Tender-Bank closes the ranking among the banks studied. It can also be noted that at large banks, quality indicators have a significant weight in the overall credit rating compared to small and medium-sized credit organizations, which characterizes their reliability and availability of potential for development. However, it is difficult to succeed in terms of quality indicators for small and medium-sized banks; therefore they should focus on quantitative indicators.

IV. SUMMARY

Thus, the described method solves the problem of the lack of an integral indicator which is presented by us as a system of quantitative and qualitative indicators. In addition to standard blocks (capital, asset quality, management, profitability, liquidity), the composition of quantitative indicators took into account the resource quality and risk exposure. The need to include quality indicators in the methodology for assessing a credit rating (territorial coverage of bank offices, sales point indicator, and bank status) was also substantiated. For each block, a 10-point scale was defined to bring the indicators under study to a single dimension, thus the maximum rating of an "ideal bank" could be 100 points. Within each block, the coefficients of significance for individual factors are determined. Probation of the methodology by the example of the banks studied reflected the current situation in the banking market, which confirms the possibility of its application in practice. It was also determined that it is easier for large banks to "get" a credit rating due to quality indicators, which is problematic for small and medium-sized credit organizations, and therefore, according to the results of the study, it was recommended for them to focus on their quantitative indicators.

V. CONCLUSIONS

The results of the study can be used in:

- Credit organizations when characterizing their position in a regional or all-Russian market, assessing their creditworthiness, and also creditworthiness of partner banks, as well as in forming a system of measures aimed at strengthening their position and enhancing competitiveness. In this regard, it is important to know the system of indicators that are fundamental when calculating a credit rating;
- The Central Bank of the Russian Federation in monitoring the level of competitiveness in the banking sector of the Russian Federation and the development of methods for its improvement;
- Scientists, economists, financiers to expand and deepen the subject areas of scientific research.

ACKNOWLEDGEMENTS

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

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