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ScienceDirect

Procedia Computer Science 102 (2016) 281 – 288

Procedia Computer Science

12th International Conference on Application of Fuzzy Systems and Soft Computing, ICAFS 2016, 29-30 August 2016, Vienna, Austria

One approach to complex evaluation of financial stability of commercial banks

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Abstract

The approach for developing automated information system for evaluating the financial stability of commercial banks on the base of applying fuzzy logic-based methods for forecasting decision making, multi-objective evaluation and ranking of alternatives is being considered. A method for evaluation of financial indicators of commercial banks on current and future periods of their financial activity was developed in the context of the current research. Approbation of the proposed method is being held and based on the example of financial reports of four arbitrary commercial banks.

Keywords: Financial stability of bank; financial coefficient; fuzzy set; fuzzy relationship

1. Introduction

As it is known, the Central Bank (CB) of any republic is a governing body of bank regulation and control over the activities of commercial banks and other credit institutions. In the process of forming relations with commercial banks, CB aims to support the stability of the entire banking system and to protect the interest of public and creditors. CB, as a rule, does not directly interfere in the activity of the commercial banks; however, it designates the order of conducting for commercial banks, controls its compliance, issues (or deprives) the license for holding banking activity. The main objective of CB, as a regulator, is that it should provide progressing economical prosperity of the country using inherent methods, and commercial banks in this situation are main guides for

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doi:10.1016/j.procs.2016.09.402

practical implementation of monetary relations, wherein CB sets compulsory order of conduct for commercial banks, regulations for credit operations and monetary circulation. Thus, periodically controlling commercial banks' compliance of the order of conduct, CB constantly controls current indices of its financial stability. In the world practice two main approaches are currently implemented for evaluation of activity of commercial bank, one of which is based on the estimation of the ranking of the bank, and the other one implies the analysis of the financial coefficients[1,2,3,4]. In particular, for determination of the degree of stability (or reliability) of the bank multiple methods for drafting bank rankings are being used, among which the most popular is "Camel" system[2]. However, in the modern environment analysis of financial stability of commercial bank is linked not only with its evaluation of stability up to the current date, but also with prognosis of its reliability in perspective. Thus, for achieving the most accurate and objective evaluation of financial and economic activity of commercial bank it is necessary to hold a comprehensive research of its financial stability, which means analysing individual financial indicators of the present and of the past, their trends and predicted values[3,4]. In other words, evaluations in the long term, in comparison with its past indices, how stable its current indices are and what to expect from it in the future-all this is required for bank stability evaluation.

2. Stability indicators of bank and ratios for their evaluation. Statement of the problem

Evaluation of financial stability of commercial bank is a multi-objective procedure, which suggests the complex application of the factors, characterising the following: capital adequacy (CA), liquidity (L), quality of liability (QL), quality of assets (QA), profitability (P), and efficiency (E). In reality, quite a large amount of ratios is being used while evaluating those factors. Thus, the ratios, which have the most significant impact on the financial stability of commercial bank, should be selected from the existing set. The main requirement to financial stability ratios of commercial bank is their compatibility, comparison of the dimensions and orientation. Based on these considerations, the following list of the most frequently used financial ratios of stability has been compiled (Table 1), where both appropriate formulas and recommended standard values are being shown[5].

Table 1. Financial stability ratios of commercial banks.

Indicator	Stability ratios	Formula (×100%)[*]	Standard value
CA	Capital adequacy ratio	F_1=C/RWA	10 (K≥5 mln. euro), 11 (K<5 mln.euro)
	Tier 1 Capital adequacy ratio	F_2=C1/RWA	6.0 (4.0[**])
QL	Client base ratio	F_3=(CD+D)/TRF	80
	Resource base stability ratio	F_4=(TL+CAC)/TL	70
	The ratio of dependence on IL	F_5=OIL/TRF	Not greater than 15
QA	Asset turnover ratio	F_6=WC/TAR	85
	Credit policy aggressiveness ratio	F_7=TD/RF	60 – 70
	Loan policy quality ratio	F_8=(TD-EPBD)/TD	96 – 99
	Percentage of overdue loans	F_9=LO/TA	Not greater than 4
	Concentration of credit risk for shareholders	F_{10}=LRPSS/C	Not greater than 35
L	The ratio of highly liquid assets and mobilization of funds	F_{11}=HLCA/CE	3.0
	Instant liquidity ratio	F_{12}=HLCA/CAC	15
	Current Liquidity ratio	F_{13}=CAS/AML	50
	Structure of raised funds ratio	F_{14}=AML/RF	Not greater than 50
P	Return on assets ratio	F_{15}=P/TA	Not less than 1.5
	Return on capital ratio	F_{16}=P/C	Not less than 8
	Net interest margin	F_{17}=GPM/IEWS	Not less than 5
	Cost structure	F_{18}=AE/NOP	Not greater than 85
E	The ratio of operating expenses and income	F_{19}=OE/OI	50 – 70
	The ratio of operating assets and liabilities	F_{20}=OE/TA	Not less than the refinancing rate to +/- 3

[*)] C - capital; C1 – Tier 1 capital; RWA – risk weighted assets; CD – citizens deposits; D – deposits; TRF –total raised funds; TL – total liabilities; CAC – current accounts; AML – accounts with maturity less than 30 days; OIL – outsourced interbank loans (IL); WC – working capital; TA – total assets; TD – total debt; RF – raised funding; EPBD – estimated provision on bad (doubtful) debt; LO – loans overdue; TAR – total arrear; LRPSS – loans to related parties or significant shareholders; HLCA – highly liquid current assets; CE – capital employed; CAS – current assets; P – profit; GPM – gross profit margin; IEWC – interest earning working capital; AE – administrative expenses (overheads); NOP – net operating profit ; OE – operating expenses; OI – operating income, [**)] Basel committee recommendations.