EARLY WARNING SYSTEM FOR THE ROMANIAN BANKING SECTOR: THE CAAMPL APPROACH

Albulescu Claudiu Tiberiu
Ecological University "Traian" Deva Faculty of Economy and Business Administration No.16, 1 Decembrie Street, Deva, Hunedoara County E-mail: claudiual@yahoo.com Phone: 0040743089759
Coroiu Sorina Ioana
University of Oradea Faculty of Economics No. 1, Univeristy Street, Oradea, Bihor County E-mail: sorina_coroiu@yahoo.com Phone: 0040740027103

In the present study we intend to build an early warning system based on the banking ratings' deterioration, by means of the CAAMPL method. This technique supposes to identify the credit institutions the most exposed to risks. The analyzed period for the Romanian banking sector covers the time frame between 1998 and 2006. During this period, a deterioration of the banks' financial status, caused by the experienced banking crisis, can be observed in a first stage, followed by a risks reduction in the period forerunning the burst out of the global financial crisis. This method will help us demonstrate that, whereas the size of the bank has a positive influence on the banking ratings, the shareholders' quality does not have the same impact.

Keywords: financial stability, early warning systems, CAAMPL ratings, Romanian banking system.

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1. Introduction

The early warning systems (EWS) enable to rapidly identify the difficulties of the economy, by means of signal disseminating indicators, fact which helps to undertake immediate measures so as to prevent the crises appearance. The goal of these methods used to quantify the stability is to provide a coherent structure in order to analyze the stability problems, to make possible the early identification of vulnerabilities, to encourage the preventive and corrective measures required to avoid financial instability.

Generally, the early warning systems are used due to their capacity to forecast the crisis' appearance, but they can at the same time be applied for other purposes. These techniques are equally used by the regulators to identify the banks which are the most exposed to risks.

In this study, we intend to analyse the evolution of the banking ratings in Romania by means of the CAAMPL method which enables the identification of the most exposed to risk banks. The analyzed period covers the years 1998-2006 and the database used for the study is Bankscope Fitch IBCA. The results indicate an improving of the banking ratings starting with 2003. According to this approach, this trend mainly occurs with the large banks of the system. However, in respect of the shareholders quality, the outcomes are contrary to the expectations. The banks which have Romanian majority shareholders show a superior solidity level.

The remainder of the paper is organized as follow. The second section presents a short overview of the EWS literature. In the third section, we describe the CAAMPL method used for the Romanian banking system. The next section analyzes the size effect and the shareholders quality effect (the literature point out the fact that the foreign shareholders have more important and consistent methods for controlling and managing the banking risks). The last section presents the conclusion of the paper.

2. Literature overview

The most important category of EWS is represented by those enabling the calculation of the probability of a financial crisis appearance. This technique covers two big important EWS

approaches: the *signal-based approach* and the *limited dependent variable approach*, which is based on *logit* or *probit* models. Most of the studies test both methods in order to be able to compare the results. The first method is usually used for identifying the indicators which can be retained in the binomial or multinomial logit models.

The *signal-based approach* knew a real success with the studies carried out by Kaminsky and Reinhart (1999). The financial indicators' behaviour before and during crisis periods is analyzed in comparison to their behaviour during normal periods. Numerous studies have used this method, mainly to identify the signals related to the appearance of a currency crisis (Vlaar, 2000; Bussières et Fratzscher, 2006; Răcaru et al., 2006).

However, a more modern method for the identification of the probability for a crisis appearance consists in the *binomial or multinomial logit* or *probit* type regression. Krkoska (2000) and Bussières et Fratzscher (2006) have used a binomial logit model to estimate the crisis appearance probability. Based on this model, Davis and Karim (2007) analyzed the probability of a banking crisis appearance. Finally, Berg and Patillo (1999) bring an important contribution to the application of the probit models.

At the same time, another purpose of EWS usage is to identify the banks which are the most exposed to risks. We deal, in this case, with early warning systems for the detection of banks' financial distress. Thus, Distinguin et al. (2006) have used a logit model to demonstrate the importance of the indicators built based on market data development (beside the accounting indicators) for the assessment of European banks' financial distress. This financial status deterioration was identified by means of the ratings provided by the external rating agencies and the outcomes led to the significant contribution of market indicators to the detection of banks financial distress. A similar exercise was performed by Poghosyan et Čihák (2009) who analyzed the European banks' deterioration with the help of a logit model, focusing in the first phase on accounting data.

3. The CAAMPL approach for the Romanian banking sector

Cerna et al. (2008) describe a particular type of EWS which provides information on the banks' solidity. This system is a banking rating or scoring system used by the National Bank of Romania (NBR) and it transmits signals on the fragility of credit institutions. We will use this technique to analyse the evolution of banking ratings in Romania and to relate these ratings to the size of the banks and to the quality of their shareholders.

The method is known as "*banking rating and early warning system*" and represents a microprudentiel EWS, which resembles to the Distinguin et al. (2006) method, but which uses however only accounting data and information on the quality of the banking management and of the shareholders. This technique is part of the "*early warning systems applied by the regulation and surveillance authorities to identify the banks which are the most exposed to risks*" (Lutton, 2006).

The architecture of the CAAMPL early warning systems used to determine the ratings' trend presents two components (Moinescu, 2007):
- a statistic model to assess the banking ratings downgrade probabilities;
- qualitative estimations made by experts by means of complementary information.

The "CAAMPL" system takes into consideration six elements which characterise a bank's activity and solidity: the capital adequacy (C); the assets' quality (A); the shareholders' quality (A); the management (M); the profitability (P) and the liquidity (L). These indicators enable the definition of a composite rating. Each of the six components is assessed on a scale from 1 to 5 where the value "1" characterises the best performance level and the value "5" the weakest level.

Four components (C – the capital adequacy, A – the assets' quality, P – the profitability and L – the liquidity) are analysed in close connection with a set of indicators which can receive different ratings. The other components (A – the shareholders' quality and M – the quality of the

management) are estimated by the experts of the NBR on the basis of the information gathered during the control missions performed at the banks' premises (*on-site*).

After the assessment of the six components specific for the performance (CAAMPL), the composite rating is established according to a rating scale from 1 to 5. A particular importance is given to the quality of the management which receives a significant weight within the composite rating. If one of the components was evaluated to a rating equal to 5, the composed rating will not pass over the level "3"[250].

The indicators used for the assessment of the CAAMPL system components (except for the quality of the shareholders and of the management) are presented in the Annex. There are 22 individual indicators which characterise the adequacy of the capital, the quality of the assets, the profitability and the liquidity of the banks.

Simplifying this technique (the composite rating is calculated as the arithmetic mean of the individual ratings), we make an analysis of the Romanian banking institutions' solidity, by means of the *Bankscope Fitch IBCA* database [251].

Fourteen indicators among those presented are retained in the analysis (see the indicators with "*" in the Annex). These indicators contain information on the capital adequacy (3 indicators), on the quality of the assets (6 indicators), on the profitability (3 indicators) and on the liquidity (2 indicators). Practically, these indicators are accounting indicators and they stand for the CAPL (*Capital*, *Assets*, *Profitability* and *Liquidity*) system.

In order to define the composite rating, we have kept the following assumptions:

H1: the composite rating is calculated, in a first phase, as an arithmetic mean of the individual ratings;

H2: if one of the individual indicators presents a rating equal to 5 (the worst rating), then the bank can not benefit from a composite rating over "3"[252];

H3: for each score equal to 5 assigned to a component, we add 0,10 points to the composite rating in order to penalize the bank's corresponding mediocre performances;

H4: finally, the composite rating is rounded.

This way we obtain the trend of the banking ratings for the period 1998-2006, leading to the possibility to identify the factors which can influence the banks' solidity.

4. The shareholders' quality and the banks' size effect

In a first stage, we compare the quality of the ratings and the quality of the shareholders (Figure 1). In theory, it is supposed that both the management and the shareholders of banking groups performing their activity at international level have a superior risk management capacity (because these institutions dispose of an adequate risk management framework). That is why we expect

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250 Briefly, the rating categories can be interpreted as follows: Composite rating 1 – The banks are viable in all the aspects and generally all their five components are assessed at the level "1" or "2". The existing deficiencies are minor and they can be easily eliminated. Composite rating 2 – The banks have a solid structure. Only the minor difficulties, which can be corrected by the Managing Board's decisions or by the management, can be pointed out. Composite rating 3 – The banks require a particular attention from the supervision authorities, for one or more of the mentioned components. Composite rating 4 – The banks are characterized by hazardous practices and they incur serious financial and administrative problems which can lead to poor results. Composite rating 5 – The banks perform an unsatisfactory activity and apply hazardous practices. They present deficiencies and use inadequate risk management techniques.

251 This database contains information on all the Romanian banks, except for Porsche Bank and Millennium Bank. The retained set includes 27 banking institutions, out of which 4 banks have Romanian majority shareholders in 2006 (2 banks with private shareholders and 2 with public shareholders). The most important banks of the system are the Romanian Commercial Bank - Erste Group and the BRD - Group Société Générale, with a share of the market reaching 29,37% and respectively 17,76% in 2006.

252 One exception to this rule is related to the rating 5 for the indicator "immediate liquidity", because this variable is equivalent to the worst score for most of the banks during the analysed period (1998-2006). The indicator is calculated by Bankscope which can use a method different from that applied by the NBR.

that the banks with foreign shareholders to be more solid than those having domestic majority shareholders.

Figure 1: The banking ratings trend correlated with the shareholders' quality
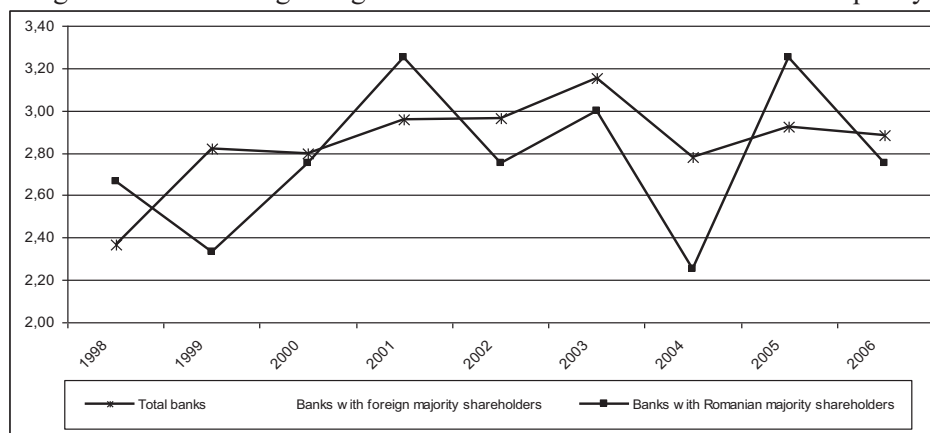
Figure 1 shows however the opposite situation – the domestic banks are, in average, more stable (except for the years 2001 and 2005)[253]. This observation has several explanations. In the first place, the Romanian Commercial Bank (the most significant bank of the system which possesses a good financial solidity) went through a privatization process completed only at the end of 2005. In the second place, the Transylvania Bank, which has Romanian majority private shareholders, disposes of the best composite rating during the analyzed period. Because the number of banks with domestic shareholders is quite reduced as compared to the number of banks with foreign shareholders, the composite rating of the entire banking sector is rather correlated with the rating of foreign shareholders banks.

Another element influencing the quality of the ratings is the size of the banks, measured as the market share, which is defined by the ratio between the bank's assets and the total assets of the banking sector[254]. In theory, the largest banks are the most solid because they have the capacity to better manage their risks and to attract competent managers. They also have the capacity to attract funds when needed. On the other hand, the costs related to risk management are considerable for the small sized institutions and the sharp battle for the market quotas makes them more vulnerable. Figure 2 shows that this assumption is confirmed because the largest banks recorded a superior rating (the average of the composite ratings indicates a solid financial status for the banks belonging to this category in 2005).

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253 We remind that a superior rating means a score equal to 1 or 2 (see left scale in Figure 1).
254 Depending on the activity volume, there are banks included in the Category I – market share superior or equal to 5%, in the Category II – market share between 4,99% and 1% and in the Category III – market share under 1%.

Figure 2: Banking ratings tendency correlated with the banks' size
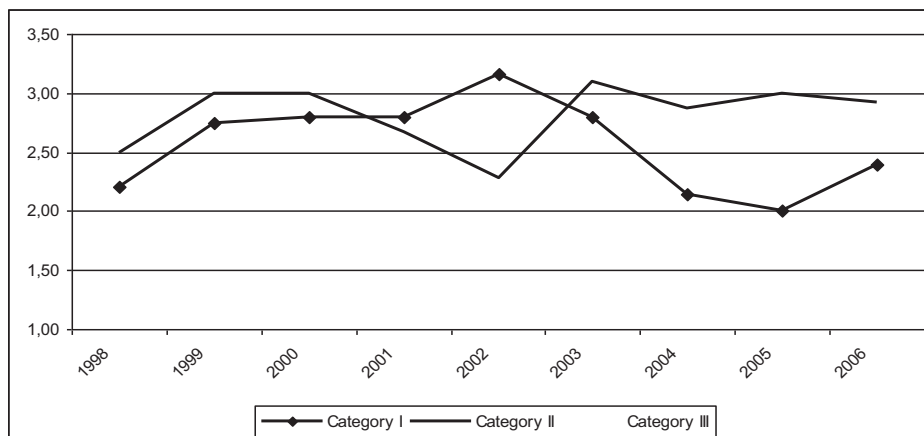
Source: Bankscope database

5. Conclusion

In conclusion, the identification of the factors which influence the ratings' degradation and the calculations of the probability for the banking financial distress can be considered as a particular type of early warning system.

In the case of Romania, we notice an improvement of banks' ratings in the period 2003-2006, even during a credit boom period. If the large banking institutions are more solid that the small sized ones (the *size effect* – according to the theory), we can assert that this affirmation does not apply to *shareholders quality effect*.

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Annex

The criteria for banks' classification depending on the indicators used for the analysis of quantifiable components CAPL

	Indicator (the formula)	Interval		Rating
	Capital adequacy (C)			
	Capital adequacy ratio 1 ($\geq$ 12%)*	$\geq$ 15%	well capitalized	
	(equity / risk weighted assets)	12 - 14,9 %	adequately capitalized	
		8 - 11,9 %	under capitalized	
		5 - 7,9%	significantly under capitalized	
		< 5%	strongly under capitalized	
	Capital adequacy ratio 2 ($\geq$ 8%)	$\geq$ 10%	well capitalized	
	(capital / risk weighted assets)	8 - 9,9%	adequately capitalized	
		6 - 7,9%	under capitalized	
		4 - 5,9%	significantly under capitalized	
		< 4%	strongly under capitalized	
	Equity ratio ($\geq$ 5%)*	$\geq$ 6%	well capitalized	
	(equity / total net assets)	4 - 5,9%	adequately capitalized	
		3 - 3,9%	under capitalized	
		2 - 2,9%	significantly under capitalized	
		< 2%	strongly under capitalized	

	Equity / share capital (>100%)*	≥ 150%	
		150 -100,0%	
		80 –99,9%	
		50 – 79,9%	
		< 50%	
	Other conditions	There is no danger to preserve an adequate level of the equity according to the regulations.	
		If the rating for the capital adequacy ratio is equal to 4, the capital adequacy component can not receive a rating superior to that assigned to the indicator. In addition, the bank's composite rating is adjusted and the institution will be noted with a rating at the most equal to the component's rating.	
		If at least one of the components was assessed to a rating equal to 5, the composite rating will not pass over the level "3".	
	Assets quality (A)		
	General risqué ratio*	≤ (the average for the system - 30% of the average for the system)	
	(risk weighted balance-sheet and off-balance-sheet assets / accounting value balance-sheet and off-balance-sheet assets)	> (the average for the system - 30%) ≤ (the average for the system - 10%)	
		> (the average for the system - 10%) ≤ (the average for the system + 10%)	
		> (the average for the system + 10%) ≤ (the average for the system + 30%)	
		> (the average for the system + 30%)	
	Total doubtful loans + in default loans / Total credit portfolio (net value)*	≤ 2%	
		2,1 - 4%	
		4,1 - 6%	
		6,1 - 8%	
		> 8 %	
	Credit risk ratio "2" non-	≤ 5%	

	adjusted exposure		
	(Loans and interests in the categories "standard loans", "doubtful loans" and "doubtful and in default loans" / Total classified loans and interests)	5,1 - 10%	
		10,1 - 20%	
		20,1 - 30%	
		> 30%	
	Weight of the banking loans and of the corresponding interests classified in "standard", "doubtful" and "doubtful and in default loans" exposition non-adjusted to equity and provisions*	≤ 5%	
		5,1 - 15%	
		15,1 - 30%	
		30,1 -50%	
		> 50%	
	Outstanding + doubtful debts / Total assets (net value)*	≤ 2%	
		2,1 - 4%	
		4,1 - 6%	
		6,1 - 8%	
		> 8 %	
	Net doubtful debts ≤ n% Equity	Cri ≤ 30% Cp et Cp > 0	
	(net patrimony) (Cri ≤ n% Cp)	30% Cp < Cri ≤ 50% Cp et Cp > 0	
		50% Cp < Cri ≤ 70% Cp et Cp > 0	
		70% Cp < Cri ≤ 100% Cp et Cp > 0	
		Cri > Cp or Cp < 0	
	Provisions coverage level*	≥ 90%	
	(banking risk reserves + credit provisions)	80 - 9,9%	
		60 - 9,9%	
		20 - 9,9%	
		< 20%	
	Provisions coverage ratio / Total net assets	≥ 8%	
		7 - 7,9%	
		5 - 6,9%	
		2 - 4,9%	
		< 2%	
	Consumption credit / Total assets (gross value)*	≤ 50%	
		50,1 - 55%	
		55,1 - 60%	
		60,1 - 65%	
		> 65 %	
	Consumption credit / loans from attracted funds (gross value)	≤ 60%	
		60,1 - 65%	
		65,1 - 70%	
		70,1 - 75%	

		> 75 %	

Profitability (P)			
ROA*		≥ 5%	
(net profit / total net assets)		4 - 4,9%	
		3 - 3,9%	
		0,6 - 2,9%	
		< 0,6	
ROE*		≥ 11%	
(net profit / equity)		8 - 10,9%	
		6 - 7,9%	
		4 - 5,9%	
		< 4%	
Basic activity profitability ratio		> 150%	
(current revenues – income from provisions) / (current expenditures – expenditures for provisions)		125 - 150%	
		115 - 124,9%	
		100 - 114,9%	
		< 100%	
Equity real increase index (depending on inflation)*		> 120%	
		110 -120%	
		100 -110%	
		90 -100%	
		<90%	

Liquidity (L)			
Liquidity indicator		≥ 1,50	
(actual liquidity / required liquidity)		1,20 - 1,49	
		1,00 - 1,19	
		0,80 - 0,99	
		< 0,80	
Immediate liquidity*		> 45%	
(deposits at banks (net value) + treasury securities) / loans from attracted funds)		45 - 40%	
		39,9 - 35%	
		34,9 - 30%	
		<30%	
Consumption credits (gross value) / Clients' deposits*		< 85%	
		85 – 104,9%	
		105 –114,9%	
		115 – 125%	
		> 125%	

Source: Cerna et al. (2008)