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Developing A Methodology for Financial Scoring of the Banking System

Gabriel Bistriceanu

Economist, Ph.D. in Finance, National Bank of Romania - Bucharest, Monetary Policy Department, 25 Lipscani Street, Sector 3, zip code: 040421.

ABSTRACT

The present paper develops a methodology for financial scoring of the banking system using a panel data from the period 2009 - 2013 for the banking systems of the 28 European Union countries. The methodology consists in determining the extremities of the intervals for each of the financial indicators of the banking system using quartiles analysis, setting the scores for each indicator and determining the category of financial rating for the banking system. Finally, it is presented a classification of banking systems for the European Union countries, for the period 2009 -2013, based on the financial rating methodology obtained.

KEYWORDS : financial scoring, banking system, rating category, quartiles, panel data.

INTRODUCTION

The financial rating of the banking system (the financial score) is a number of points determined based on an analysis of a set of criteria considered. To determine the financial rating, it can be used as a set of criteria the following financial indicators of the banking system: solvency, liquidity, loans quality, profitability, various metrics for market banking risks.

Developing a financial scoring methodology for banking system is useful both for the national banking regulatory - supervisory authority and multinational banking authority (European Banking Authority for instance) in a certain economic union: (i) in the first case, it can use the financial scoring to assess each bank individually; (ii) in the second case, it can use the financial scoring for the evaluation of each national banking system in the economic union. In both situations, depending on the financial indicators values, various scores obtained for them and the financial rating, it may require measures to improve the financial indicators of the banks or banking systems.

A well - known banking rating system is CAMEL. This is a quantitative technique that consists of a set of performance measures based on the following rates: capital adequacy, assets quality, management, earnings and liquidity. CAMEL was implemented firstly in U.S. in 1979, and later globally. In 1995, the Federal Reserve and the O.C.C. replaced CAMEL with CAMELS, adding the "S" which stands for the sensitivity to market risk. Several studies examined the utility of CAMEL ratings for the monitoring of banks. With respect to predicting bank failure, Barker and Holdsworth (1993) found evidence that CAMEL ratings are useful, even after controlling for a wide range of available information about the banks. Cole and Gunther (1998) found that although CAMEL ratings contain useful information, it decays quickly. Hirtle and Lopez (1999) found that, over the period from 1989 to 1995, the supervisory CAMEL information gathered during the last on-site exam remains useful with respect to the current condition of a bank. Nimalathasan (2008) used CAMELS rating system to made a comparative study of financial performance of banking sector in Bangladesh. Christopoulos, Mylonakis and Diktapanidis (2011) examined the case of Lehman Brothers by analysing its financial particulars of the 2003 - 2007 period using the CAMELS ratios.

FINANCIAL SCORING OF THE BANKING SYSTEM. THE EUROPEAN UNION BANKING SYSTEMS CASE

In order to determine a methodology of financial rating for the banking system, we used statistical data for the banking systems of the 28 EU countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom. **Statistical data source** for our analysis is Financial Soundness Indicators from the International Monetary Fund.

We used five financial indicators for financial scoring the banking system: (i) solvency; (ii) loans quality; (iii) assets liquidity; (iv) profitability; (v) foreign exchange risk.

The solvency indicator is calculated as the regulatory capital to risk-weighted assets ratio. It measures the capital adequacy of credit institutions from the banking system.

The loans quality indicator is calculated as the non-performing loans to total gross loans ratio.

The assets liquidity indicator is calculated as the liquid assets to total assets ratio. This ratio provides an indication of the liquidity available to meet demands for cash.

The profitability indicator is return on equity (calculated by dividing net income by the average value of capital over the same period).

The foreign exchange risk indicator is calculated as the mode value of the net open position in foreign exchange to capital ratio. This indicator shows the sensitivity to foreign market risk, compared with capital. It measures the mismatch of foreign currency asset and liability positions to assess the vulnerability to exchange rate movements.

In our analysis, we created a panel annual data sample for the five financial indicators above for the 28 European Union countries banking systems. The sample length is five years (2009, 2010, 2011, 2012, 2013). The panel data sample is unbalanced because of the lack of the statistical data in some years and for some indicators from some countries (see Table 4 for some detailed data in median terms for each country during the 2009 -2013 period).

We set the intervals extremities of each of the five financial indicators calculating three of the five quartiles of the data sample. The three quartiles used in our analysis are: (i) quartile 1 is the first quartile (the 25th percentile) of the data sample; (ii) quartile 2 is the median value of the data sample (the 50th percentile); (iii) quartile 3 is the third quartile (the 75th percentile) of the data sample.

We set the extremities of the intervals as follows: FI<=q1, q1<FI<=q2, q2<FI<=q3, FI>q3, where: FI is one of the five financial indicators of the banking system (solvency, loans quality, assets liquidity, profitability and foreign exchange risk); q1, q2, q3 are quartiles 1, 2, and 3, respectively. For each of the above four intervals we used one of the following scores: 1 point, 2 points, 3 points or 4 points (the best are the 4 points score).

For the sample mentioned above, the three quartiles calculated are presented in Table 1.

Table 1: The quartiles for financial indicators of the European Union banking systems

Financial Indicators (in %)	Quartiles (in %)		
	q1	q2	q3
Solvency	12.7	14.8	17.0
Loans quality	3.7	5.4	11.9

Assets liquidity	19.4	24.5	34.0
Profitability	0	6.8	11.1
Foreign exchange risk	0.6	1.8	5.4

From the economic point of view, it is good to have higher values for the solvency, assets liquidity and profitability and lower values for the non-performing loans and foreign exchange risk. In the Table 1 above, higher values than the quartiles 3 for solvency, assets quality and profitability means good scores for the banking system. Lower values than quartiles 1 for loans quality and foreign exchange risk means good scores for banking system.

We used the three quartiles above to determine de five intervals for each financial indicator of the banking system. For each interval of the financial indicator we use one of the following scores: 1 point, 2 points, 3 points or 4 points, where 1 point is the weakest score and 4 points is the strongest score. The correspondence between the financial indicators and the scores is presented in Table 2.

Table 2: The correspondence between the intervals of European Union banking systems financial indicators and scores

Financial Indicators (in %)	Scores (in points)	
	1	2
Solvency (SV)	SV<=12.7	12.7<SV<=14.8
Loans quality (LQ)	LQ>11.9	5.4<LQ<=11.9
Assets liquidity (AL)	AL<=19.4	19.4<AL<=24.5
Profitability (P)	P<=0	0<P<=6.8
Foreign exchange risk (FR)	FR>5.4	1.8<FR<=5.4
Financial Indicators (in %)	Scores (in points)	
	3	4
Solvency (SV)	14.8<SV<=17.0	SV>17.0
Loans quality (LQ)	3.7<LQ<=5.4	LQ<=3.7
Assets liquidity (AL)	24.5<AL<=34.0	AL>34.0
Profitability (P)	6.8<P<=11.1	P>11.1
Foreign exchange risk (FR)	0.6<FR<=1.8	FR<=0.6

We calculated the financial ratings of the banking systems as a weighted arithmetic average, with equal weights, of the scores obtained for the five categories of financial indicators, as follows:

$$R = \sum_{i=1}^{5} p_i * w_i$$

where:

p_i is the score for the i criterion; $p_i \subset \{1,2,3,4\}$

i is one of the following financial indicators: solvency, loans quality, assets liquidity, profitability, foreign exchange risk. $i = \overline{1..5}$

$$\sum_{i=1}^{5} w_i = 100\%$$

In the majority of cases, the statistical data were available at least for one year for each financial indicator. In these cases, .

$$w_1 = w_2 = w_3 = w_4 = w_5 = 20\%.$$

However, for the banking system from Finland, Netherlands and Portugal, the statiscal data for foreign exchange risk were not available. In these cases,

$$w_1 = w_2 = w_3 = w_4 = w_5 = 20\%.$$

For the banking system from Spain only data for solvency, loans quality and profitability indicators were available. In this last case, .

$$w_1 = w_2 = w_3 = w_4 = w_5 = 20\%.$$

We set the rating categories, as follows (Table 3):

Table 3: The rating category of the banking system

Ratings (R) in points	1<=R<=2	2<R<3	3<=R<=4
Rating category	Weak	Moderate	Strong

The ratings for the banking system in the European Union are presented in Table 4.

Table 4: Median values of the solvency, loans quality, assets liquidity, foreign exchange risk, profitability over 2009 - 2013 period and the ratings for the European Union banking systems

	SV	LQ	AL	FR	P	R
Austria	15.8	2.8	25.3	0.3	2.7	**3.2**
Belgium	18.5	3.3	34.3	2.3	3.4	**3.2**
Bulgaria	17.4	13.5	21.5	0.2	7.05	**2.8**
Croatia	20.5	12.3	32	2.3	8.3	**2.6**
Cyprus	10.2	7.6	28	1	-26.8	**2.0**
Czech Republic	15.3	5.2	29.9	1.1	19.7	**3.2**
Denmark	17.75	4.45	17.7	25.8	0.65	**2.2**
Estonia	20	4	16.7	23.6	14.2	**2.6**
Finland	14.6	2.5	7.5	...	10.1	**2.5**
France	12.55	4.15	41.9	0	7.75	**3.0**
Germany	16.4	3.1	41.1	4.4	9.8	**3.2**
Greece	11.7	27.3	32.3	15.9	0	**1.4**
Hungary	13.9	13.4	24.7	19.8	0.4	**1.8**
Ireland	18.9	16.1	25.1	0.4	-10.8	**2.6**
Italy	12.7	11.7	12.3	1.7	0.7	**1.8**
Latvia	16.5	14.1	30.9	9.05	5.1	**2.0**
Lithuania	14.8	18.8	23.4	0.5	4.9	**2.2**
Luxembourg	19	0.2	58.1	0.6	11.5	**4.0**
Malta	13.5	7.4	24.9	0	19.1	**3.0**
Netherlands	14.2	3	24.5	...	8.9	**2.8**
Poland	13.9	4.9	20.8	0.3	13.3	**3.0**
Portugal	10.5	5.2	14.8	...	-5.4	**1.5**
Romania	14.9	14.3	57.9	2.3	-1.7	**2.2**
Slovak Republic	13.4	5.3	38.3	1.2	9.1	**3.0**
Slovenia	11.4	11.8	14.2	1.8	-11.8	**1.6**
Spain	12	6	...	...	8	**2.0**
Sweden	11.9	0.7	21.4	5.4	14.1	**2.6**
United Kingdom	15.8	3.85	20.8	3.05	5.95	**2.4**

Solvency (SV), LoansQuality (LQ), Assets Liquidity (AL), Foreign exchange risk (FR) and Profitability (P) are in %. The rating (R) is in points.

In Table 5, the banking systems for European Union countries from Table 4 are arranged by rating categories.

Table 5: Classification of European Union banking systems by categories of rating during 2009 -2013 period

Rating category of the banking system	EU Countries
Weak	Cyprus, Greece, Hungary, Italy, Latvia, Portugal, Slovenia, Spain
Moderate	Bulgaria, Croatia, Denmark, Estonia, Finland, Ireland, Lithuania, Netherlands, Romania, Sweden, United Kingdom
Strong	Austria, Belgium, Czech Republic, France, Germany, Luxembourg, Malta, Poland, Slovak Republic

It can be said on the basis of the information shown in Table 5 that the banking systems from Cyprus, Greece, Hungary, Italy, Latvia, Portugal, Slovenia and Spain are in weak rating category. They are less resistant to the adverse conditions and would likely deteriorate if a concerted action is not effective in correcting the areas of weakness. Consequently, these banking systems are vulnerable and require more than normal supervisory attention of the banking authorities. The banking systems from Bulgaria, Croatia, Denmark, Estonia, Finland, Ireland, Lithuania,

Netherlands, Romania, Sweden and United Kingdom are in moderate rating category; in general, they are fundamentally sound and the supervisory response of the banking authorities is limited. The banking systems from Austria, Belgium, Czech Republic, France, Germany, Luxembourg, Malta, Poland and Slovak Republic are in strong rating category; they are sound in almost every financial aspect and they can resist to external economic and financial disturbances without the intervention of banking supervisory authorities.

CONCLUSIONS

The findings of this paper are multiple. Using a panel data from the period 2009 - 2013 for the banking systems of the 28 European Union countries, we developed a methodology for financial scoring of the banking system. The methodology consists in determining the extremities of the intervals for each of the five financial indicators of the banking system using quartiles analysis, setting the scores for each indicator and determining the category of financial rating for the banking system. This rating model obtained allows a unitary financial evaluation of the banking systems from different countries and is useful to evaluate banks individually too. Finally, we presented a classification of banking systems for the European Union countries based on the financial rating obtained in this paper for the period 2009 -2013.

REFERENCES

[1]Barker, D. and Holdsworth, D. (1993), "The Causes of Bank Failures in the 1980s", Research Paper No. 9325, Federal Reserve Bank of New York. | [2]Cole, R.A. and Gunther, J.W. (1998), "Predicting Bank Failures: A Comparison of On- and Off-Site Monitoring Systems", Journal of Financial Services Research 13, pp. 103-117. | [3]Christopoulos, Apostolos G., Mylonakis, John and Diktapanidis, Pavlos (2011), "Could Lehman Brothers' Collapse Be Anticipated? An Examination Using CAMELS Rating System", International Business Research Vol. 4, No. 2. | [4]Federal Deposit Insurance Corporation (1997),"Uniform Financial Institutions Rating System", Federal Register ,Vol. 62, No. 3. | [5]Hirtle, B.J. and Lopez, J.A. (1999), "Supervisory Information and the Frequency of Bank Examinations", Federal Reserve Bank of New York Economic Policy Review 5, pp. 1-20. | [6]Nimalathasan B. (2008), „A comparative study of financial performance of banking sector in Bangladesh – An application of CAMELS rating", Annals of University of Bucharest, Economic and Administrative Series, Nr. 2 (2008) 141-152. |