

## **Establishing the Financial Rating of the Banking System. A European Perspective**

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### **Abstract**

The present paper develops a methodology for determining the financial rating 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 the banking systems of the European Union countries, for the period 2009 -2013, based on the financial rating methodology obtained.

**Keywords:** financial rating, 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: solvency, liquidity, loans quality, profitability, various metrics for market banking risks.

Developing a financial rating 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 rating to assess each bank individually; (ii) in the second case, it can use the financial rating 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 make a comparative study of financial performance of banking sector in Bangladesh. Christopoulos, Mylonakis and Diktapanidis (2011) examined the case of Lehman Brothers by analyzing its financial particulars of the 2003 - 2007 periods using the CAMELS ratios.

### **Determining the Financial Rating of the Banking System. The Case of the Banking Systems from the European Union**

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 determining the financial rating of 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 and 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 no. 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 25<sup>th</sup> percentile) of the data sample; (ii) quartile 2 is the median value of the data sample (the 50<sup>th</sup> percentile); (iii) quartile 3 is the third quartile (the 75<sup>th</sup> percentile) of the data sample.

We set the extremities of the intervals as follows:  $FI \leq q1$ ,  $q1 < FI \leq q2$ ,  $q2 < FI \leq q3$ ,  $FI > q3$ , 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 no. 1.

**Table no. 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 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 the 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 no. 2.

**Table no. 2:** The correspondence between the intervals of European Union banking systems financial indicators and scores

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

$R$  is the financial rating of the banking system;

$P_i$  is the score for the  $i$  criterion,  $P_i \in \{1,2,3,4\}$ ,

$i$  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 statistical data for foreign exchange risk were not available. In these cases

$$w_1 = w_2 = w_3 = w_4 = 25\%$$

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

$$w_1 = w_2 = w_4 = 33.33\%$$

We set the rating categories, as follows (Table no. 3):

**Table no. 3:** The rating category of the banking system

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

The ratings for the banking system in the European Union are presented in table no. 4.

**Table no. 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	<b>3.2</b>
Belgium	18.5	3.3	34.3	2.3	3.4	<b>3.2</b>
Bulgaria	17.4	13.5	21.5	0.2	7.05	<b>2.8</b>
Croatia	20.5	12.3	32	2.3	8.3	<b>2.6</b>
Cyprus	10.2	7.6	28	1	-26.8	<b>2.0</b>
Czech Republic	15.3	5.2	29.9	1.1	19.7	<b>3.2</b>
Denmark	17.75	4.45	17.7	25.8	0.65	<b>2.2</b>
Estonia	20	4	16.7	23.6	14.2	<b>2.6</b>
Finland	14.6	2.5	7.5	...	10.1	<b>2.5</b>
France	12.55	4.15	41.9	0	7.75	<b>3.0</b>
Germany	16.4	3.1	41.1	4.4	9.8	<b>3.2</b>
Greece	11.7	27.3	32.3	15.9	0	<b>1.4</b>
Hungary	13.9	13.4	24.7	19.8	0.4	<b>1.8</b>
Ireland	18.9	16.1	25.1	0.4	-10.8	<b>2.6</b>
Italy	12.7	11.7	12.3	1.7	0.7	<b>1.8</b>
Latvia	16.5	14.1	30.9	9.05	5.1	<b>2.0</b>
Lithuania	14.8	18.8	23.4	0.5	4.9	<b>2.2</b>
Luxembourg	19	0.2	58.1	0.6	11.5	<b>4.0</b>
Malta	13.5	7.4	24.9	0	19.1	<b>3.0</b>
Netherlands	14.2	3	24.5	...	8.9	<b>2.8</b>
Poland	13.9	4.9	20.8	0.3	13.3	<b>3.0</b>
Portugal	10.5	5.2	14.8	...	-5.4	<b>1.5</b>
Romania	14.9	14.3	57.9	2.3	-1.7	<b>2.2</b>
Slovak Republic	13.4	5.3	38.3	1.2	9.1	<b>3.0</b>
Slovenia	11.4	11.8	14.2	1.8	-11.8	<b>1.6</b>
Spain	12	6	...	...	8	<b>2.0</b>
Sweden	11.9	0.7	21.4	5.4	14.1	<b>2.6</b>
United Kingdom	15.8	3.85	20.8	3.05	5.95	<b>2.4</b>

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

In table no. 5, the banking systems for European Union countries from table no. 4 are arranged by rating categories.

**Table no. 5:** Classification of European Union banking systems by categories of rating during 2009 -2013 period

<b>Rating category of the banking system</b>	<b>EU Countries</b>
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 no. 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 determining the financial rating 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 resulting that, in European Union, 8 banking systems are in weak rating category, 11 banking systems are in moderate rating category and 9 banking systems are in strong rating category.

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