A CROSS-COUNTRY ANALYSIS OF THE BANKS' FINANCIAL SOUNDNESS: THE CASE OF THE CEE-3 COUNTRIES

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Abstract: The European integration process has a direct impact on all the components of the macroeconomic environment. The existence of a well functioning and sound banking sector becomes of great importance for the integration process as the European Union economy is financed especially through this channel. The banking sectors of the new EU member countries have undergone through tremendous changes in the last decade, both from an ownership and also from a business strategy point of view, these changes having a direct impact on their financial soundness. Thus, the aim of our research is to empirically examine the financial soundness of the banks operating in Bulgaria, Czech Republic and Romania, three EU members countries from Central and Eastern Europe (CEE-3). In order to achieve this we have employed a combine quantitative analysis based on the CAMELS framework (namely Capital Adequacy, Asset quality, Management soundness, Earnings, Liquidity, Sensitivity to market risk) and the Z-score, thus being able to underline simultaneously the financial soundness and the possibility of default for the banks from our sample. The analysed period is 2004-2011 providing us with an evaluation of the impact that the EU ascension and also the global financial crisis had on the financial soundness of the analysed banks. Our sample is composed from 40 commercial banks that operate in Bulgaria, the Czech Republic and Romania, that overall own over 75% of the total banking assets, making this study one of the most comprehensive undertaken to this date. The data that we have employed in our research is obtained from the Bureau Van Dijk Bankscope database and the annual financial statements of the banks from our sample. The paper through its original dual approach contributes to the academic debate by providing not only insight into the financial soundness of the banks operating in the CEE-3 countries but also underling their financial strength through the usage of the Z-score. Thus, the topic of the paper is focused on a subject of great importance for the European integration process.

Keywords: integration, financial soundness, CAMELS framework, Z score

JEL classification: G01; G21; O52

1. Introduction

The recent global crisis, through its severe implications on the financial systems and the real economy, underlines the major importance that the evaluation of banking sector soundness has for the identification of the weak points and the vulnerable banks, being known that if the problems are identified late the solutions for solving

them are more costly and the risk that the vulnerabilities will spread in the whole banking system are grater.
To assess the soundness and stability of the banking system a wide range of tools is used, among which stands out especially the analysis of a set of quantitative indicators conceived by the IMF and World Bank (IMF and World Bank, 2005). In order to ensure the comparability of data at an international level, the IMF published in March 2006 a Compilation Guide on Financial Soundness Indicators. According to this publication, given the complex nature of the financial system and the interconnections between the financial system and the real economy, financial soundness indicators are divided into two groups, namely the first group (entitled the core set) composed of the main indicators of the banking sector, at which references our paper as well, and the second group (entitled encouraged set) composed of other indicators of the banking sector and also of a series of non-banking sector indicators.
The core financial soundness indicators refer to six key areas of banking activity resulting from the CAMELS framework (namely *C*apital Adequacy, *A*sset quality, *M*anagement soundness, *E*arnings, *L*iquidity, *S*ensitivity to market risk), considered one of the most popular methods of analysis and assessment of the financial soundness of banks.
The major importance that the assessment and analysis of the banking sector soundness has led central banks from a series of countries (like the Central Bank of the Turkey, The Swiss National Bank, Netherlands Central Bank, Czech National Bank) to intensify their concerns regarding the creation of an aggregate indicator of the soundness of the banking sector, based on the consideration that the banks are the most important component of the financial system in terms of financial stability (Geršl and Heřmánek, 2006).
In this context, the aim of our research is to examine the financial soundness of the banks operating in Bulgaria, Czech Republic and Romania, three EU members countries from Central and Eastern Europe (CEE-3). In order to achieve this we have employed a combine analysis based on the CAMELS framework and the Z-score thus being able to underline simultaneously the financial soundness and the possibility of default for the banks from our sample. The analysed period is 2004-2011 providing us with an overview of the impact that the EU ascension and the global crisis had on the stability of the analysed banks.
Our research is structured as follows: the second part provides a review of the academic literature on this theme, the third part presents the data and methodology used, the fourth part is dedicated to the analysis and discussion of the selected banks soundness and the fifth part contains the concluding remarks.

2. Literature review

The existence of a strong, solid and stable banking sector represents an extremely important element for all participants to the economic environment either depositors, investors or entrepreneurs especially in the case of the new EU member countries, in which case the economy is financed overwhelmingly through this channel. Taking these into account, the subject of the financial soundness and performances of the banking system has become, especially in the last period of time, the focus point of both public authorities and scholars.

One of the most used models for the estimation of a bank performance and financial soundness has been in the last years represented by the CAMELS framework (Baral, 2005). In practice this system has been used by the regulatory authorities as a bank supervision instrument (Gilbert et al, 2000; Hays et al, 2009) and also as a model for the evaluation of the performances registered by a banking institution (Derviz et Podpiera, 2008; Atikoğulları, 2009; Mishra et al., 2012). The popularity and robustness of this method is also underlined by the inclusion in the handbook for the evaluation of the IMF members banking sector financial soundness of the CAMELS framework (Sundararajan et al, 2002).

Also in the academic literature the CAMELS framework has been employed in order to estimate the soundness of various banking systems. Thus, Godlewski (2005) tests the validity of the CAMELS framework for banks defaults models in emerging markets. The results confirm that the indicators for bank solvability, assets quality, liquidity, management quality and profitability have a negative impact on the probability of banks default. Brossard et al. (2007) estimate an early warning model for banks failure using the CAMELS framework for a panel of 82 EU banks for the period 1991-2005. The obtained results underline that a measure of past average growth of assets can be a very good predictor for future possible banks difficulties. Wang (2012) explores the relationship between the operating performance and corporate governance of bank holding companies in the United States of America. The results underline the positive link between corporate governance and the improvement of the financial soundness indicators from the CAMELS framework.

In recent years another indicator, namely the Z-score, has become a rather popular indicator for the underling of the financial soundness for banking institutions in various researches (Hesse et Čihák, 2007; Beck et al., 2012; Borgioli, 2013). The main reason for this evolution is that the Z-score enables an easy and direct way to interpret the financial soundness of a banking institution, underling the ability of a bank to face risk with the capital and profit buffers that the banking institution has. The research of Stiroh (2004) assesses potential diversification benefits for the US banks that have steadily increased their reliance to non-traditional business activities. The results imply that the move toward noninterest income is actually worsening the risk/return trade-off measured with the help of the Z score for the typical bank, as volatility increases while average returns decrease. Mercieca et al. (2007) investigate whether the observed shift into non-interest income activities improves the performance of small European banking institutions, employing for this a sample of 755 small banks over the period 1997–2003. The negative correlation between the Z score and the diversification of the small banking institutions underline that European small banks are entering market niches on which they have no expertise and implicitly the risks tend to increase rather than decrease.

Despite all these, the number of studies focused on the new EU member countries that employ the CAMELS framework or the Z score, or both methods, in order to underline the financial soundness of the banking institutions that operate in these countries is rather small (e.g. Ivičić, 2008; Albulescu et Coroiu, 2009; Dardac et Moinescu, 2009). Thus, our research intends to fill this gap by providing an analysis of the financial soundness for the Bulgarian, Czech Republic and Romanian banking sector in the EU ascension and financial crisis period, employing a dual approach based on the CAMELS framework and the Z score.

3. Data and methodology

Our sample is composed from 40 commercial banks, 11 from Bulgaria (owning 69,95% of total assets), 14 from the Czech Republic (owning 85,58% of total assets) and 15 from Romania (owning 78.10% of total assets). The data that we have employed in our research is obtained from the Bureau Van Dijk Bankscope database and the annual financial statements of the banks from our sample.
We have calculated the average individually for each of the indicators and parameters of the CAMELS framework for the period 2004-2011 (see table 1). The obtained results have been used to rank the banks, rank one being attributed to the best performing banking institution the rest of the banks being ranked accordingly, using a step of one. In the case in which we have obtained the same average for two banks we have attributed to those banks the average of their ranks. Averaging the ranked obtained for the different components of the CAMELS framework we have estimated the financial soundness of the commercial banks from our sample.
In order to estimate the *capital adequacy* of the banks from our sample we have employed two indicators. The first is the *total capital ratio* that reflects the ability of a bank to meet the time liabilities and other risks such as credit risks or operational risks. Generally there is a statutory level for the banks regarding this indicator, currently being at 10% for the banks operating in Romania, 8% in the case of the Czech Republic and 12% for the banks operating in Bulgaria. The highest rank is attributed to the bank that has registered the highest score for this indicator. The second indicator used is represented by the *ratio of the equity to total assets*. This indicator measures the proportion of the total assets that are financed by the shareholders of the banks, implicitly the highest rank being attributed to the bank that has registered the highest level for this indicator.
For the *assets quality* we have used three indicators, namely the *loan loss provisions to net interest revenues* ratio, the *impaired loans to gross loans ratio* and the *total loans to total assets ratio*. The *loan loss provisions to net interest revenues* underlines the ability of a bank to cover the expenses with the provisions for impaired loans from the interest that it collects, thus the lower the value of this indicator the higher the rank. The *impaired loans to gross loans* ratio underlines the ability of a bank to grant loans to prime clients that will repay their debts. Thus, the lower this ratio the better the quality of the loans portfolio and the banks will reach a higher rank. The ratio of *total loans to total assets* underlines how diversified is the activity that a banking institution undertakes. Despite being an important part of the total assets, if their ratio to total assets is high this exposes the bank to loans losses, thus the lower the value for this indicator the higher the ranked attributed.
In order to assess the *management quality* of the analysed banks we have used two indicators, namely the *operating expenses to total assets* and the *interest expenses to deposits*. The *operating expenses to total assets* ratio underlines the ability of the management to operate the daily activities of the banks at a lower cost, implicitly the bank with the lowest level of this indicator being ranked first. The interest expenses to deposits emphasis the ability of a bank to attract deposits at a low cost, thus the highest rank is attributed to the bank with the lowest score.
The earnings abilities of the banks from our sample are underlined by three indicators: the *cost to income ratio*, *ROA* and *ROE*. The cost to income ratio is obtained by dividing the operational costs to operational incomes and underlines how efficiently the bank is being run, implicitly the lower this ratio the more profitable the bank will be. Return on Assets (ROA) and Return on Equity (ROE) underline how

profitable are the bank assets / equity in generating revenues. Thus, the higher these indicators, the higher that bank will be placed in our rankings.
The *liquidity* of the banking institutions from our sample is underlined by their *liquid assets to deposits* ratio and the *net loans to deposits* ratio. The *liquid assets to deposits* ratio underlines the ability of a bank to withstand a possible bank-run, the higher this indicator the more secure that banking institution is, thus the highest rank is attributed to the bank with the highest score for this indicator. *Net loans to deposits* ratio underlines the ability of a bank to fund its activity from the attracted deposits. If this indicator is above 1 that the bank is close to become insolvent, thus the lower the score obtained the higher the rank achieved.
In order to underline the *size of the assets* that a bank has we have calculated the ratio of its *assets to the total assets of the banking sector*. Thus, the higher this ratio the more important is the bank for that given banking sector and the higher the rank achieved.
Alongside the CAMELS framework we have employed also the *Z-score* in our research, which determines the distance to insolvency for a bank (Roy, 1952) and is computed using the formula:

$$Z-\text{score}=\frac{\text{ROA}+(\text{E/A})}{\sigma(\text{ROA})} \quad \textbf{(1)}$$

where ROA represents the return on assets, E/A is the ratio of total equity to total assets and σROA is the standard deviation of the return on assets. We have used as the denominator the standard deviation of the return on assets as we did not wanted to allow the Z-score to be exclusively driven by the variation of the capitals or the profitability. The Z-score can be interpreted as the number of standard deviation by which the returns on assets must fall from the mean in order to consume all the equity that a bank has and implicitly produce its bankruptcy (Boyd and Runkle, 1993). Thus, the higher the Z-score, the less that banking institution is likely to go bankrupt.

Table 1: Summary statistics for the banks data used in our research for the period 2004-2011

	Indicators	Bulgaria		Czech Rep.		Romania	
		Avg.	**St. dev.**	**Avg.**	**St. dev.**	**Avg.**	**St. dev.**
C	Total Capital Ratio	18.24	11.28	23.12	19.44	18.09	6.61
	Equity / Total Assets	14.01	9.78	11.60	9.82	10.94	1.39
	Impaired Loans / Gross Loans	4.30	2.22	4.42	3.09	7.42	3.83
A	**Loan Loss Prov/ Net Inter. Rev.**	21.37	9.87	17.22	11.11	33.31	23.89
	Total loans / total assets	64.41	9.87	54.19	15.77	56.22	8.33
	Op. expenses / Total Assets	3.28	1.16	1.82	1.35	5.39	1.79
M	Interest expenses / Deposits	4.46	3.94	3.51	3.37	6.25	1.86
	ROAA	1.78	0.62	1.08	1.09	0.77	1.29
E	ROAE	14.93	4.71	14.25	8.73	4.47	22.66
	Cost to Income Ratio	52.72	13.11	52.15	32.14	69.59	14.84
L	Liquid Assets / Dep & ST Fund.	58.42	93.66	44.32	37.96	36.60	4.15
	Net loans / Dep & ST Funding	141.97	182.23	110.9	128.28	71.43	15.07
S	Tot. Assets / Total sector assets	6.02	4.80	6.53	8.25	5.52	6.38

Source: Authors calculations based on Bureau Van Dijk Bankscope database (https://bankscope2.bvdep.com)

The banks operating in the Czech Republic are registering the best performances

in the case of the *capital adequacy* indicator, this being attributed to the more stricter approach that has been imposed by the national regulatory authorities in the aftermath 1999 banking crisis. The banks operating in Romania and Bulgaria are registering similar performances, that are however well above the minimal requirements imposed in these countries for banks capital adequacy ratios.
In the case of the *assets quality* indicators we can observe again that the Czech Republic banks have registered the best performances. By contrast, the Romanian banks have registered the highest impaired loans to gross loans ratio and loan loss provisions to net interest revenues ratio as a result of the high deterioration of the Romanian macroeconomic environment that took place once the financial global crisis has started. It is worth mentioning also that the Bulgarian banks are registering the highest ratio of total loans to total assets, making them extremely vulnerable to the evolution of the non-performing loans.
The *management quality* indicators provide an overview of the superior capabilities of the Czech banks to organise their daily operations in an efficient and impactful meaner. The banks operating in Romania are registering the lowest performances, mainly because of the late privatisation of the largest bank in the system, Banca Comercială Română, in 2006. Another reason for the poor performance is represented by the high level of interest to deposits that the Romanian banks had to pay, especially in the aftermath of the global financial crisis in order to be able to attract sufficient liquidity from the market and thus comply with the new prudential requirements imposed by the National Bank.
The indicators for *earnings and profitability* underline the advantage that exists for the banks operating in Bulgaria that have to pay an income tax of only 10%. Also, the cost to income ratio underlines the ability of the Czech banks to operate at a lower cost than their Bulgarian and Romanian peers, especially taking into account the high income tax of 15% that they must pay.
The *liquidity* indicators suggest a split situation between the banks operating in the three countries. Thus, on the one hand the Bulgarian banks are the most liquid ones, while the banks from Romania are registering the lowest value for the ratio of net loans to deposits and short term funding, this underling the ability of these banks to completely cover their granted loans from the deposits attracted, making them the less probable to default in the case of a bank run.
In the case of the *size of the assets* indicator, the results registered in the case of the bank operating in the Czech Republic underline the high level of concentration that this banking sector has. The high standard deviation also points out to the high discrepancy that exists between the larger banks and the smaller one. A similar situation is registered also in the case of the Bulgarian and Romania.

4. Empirical results

The obtained results in the case of the banks operating in Bulgaria for the CAMELS framework are displayed in table 2. In this case the top five ranked banks are UniCredit Bulbank, Raiffeisenbank, DSK Bank, Corporate Commercial Bank and United Bulgaria Bank. We must underline that the biggest bank in Bulgaria, UniCredit Bulbank, has managed not only to be ranked first in the CAMELS framework but also has obtained the best ranked for the management quality. On the other hand the lowest five ranked banks are: Allianz Bank Bulgaria, Societe General Expressbank, First Investment Bank, MKB Unionbank and Procredit Bank. Allianz Bank Bulgaria,

MKB Unionbank and Procredit Bank are also the smallest banks from our sample in the case of Bulgaria.

Table 2: Ranking of the Bulgarian banks based on the CAMELS framework

	C	A	M	E	L	S	Avg.	Rank
Allianz Bank Bulgaria	10.5	2	6	8	2	8	6.08	**7**
Bulgarian Develop. Bank	1	7	6	5.5	5	11	5.92	**6**
Corporate Commercial Bank	10.5	1	6	5.5	1	7	5.17	**4**
DSK Bank	3	10	4	1	10	2	5.00	**3**
First Investment Bank	9	3	10	11	8.5	5	7.75	**9.50**
MKB Unionbank	7.5	8	9	9.5	3.5	9	7.75	**9.50**
Procredit Bank	6	6	11	9.5	11	10	8.92	**11**
Raiffeisenbank	4.5	9	2	4	6	4	4.92	**2**
Societe General Expressbank	7.5	4	8	7	7	6	6.58	**8**
UniCredit Bulbank	2	5	1	2	3.5	1	2.42	**1**
United Bulgaria Bank	4.5	11	3	3	8.5	3	5.50	**5**

Source: Authors calculations

For the banks operating in the Czech Republic the results for the CAMELS analysis are presented in table 3. We can observe that the best results have been achieved by: Stavební Sporitelna Ceské Sporitelny, Ceskoslovenska Obchodni Banka, Komercni Banka, PPF banka and Ceska Sporitelna. It is worth mentioning that the biggest three banks by assets, namely: Stavební Sporitelna Ceské Sporitelny, Ceskoslovenska Obchodni Banka and Ceska Sporitelna are also in the top five ranked banks. By contrast, the lowest four ranked banks are: GE Money Bank, Czech Export Bank, Equa Bank and Modra Pyramida Stavebni Sporitelna. Also in this case, except GE Money Bank, the lowest rank has been obtained by some of the smallest banks from our Czech Republic sample.

Table 3: **Ranking of the Czech banks based on the CAMELS framework**

	C	A	M	E	L	S	Avg.	Rank
Ceska Sporitelna	11.5	6.5	5.5	4.5	10	2	6.67	**5**
Ceskomoravska Stavebni	13	4	5.5	7	13	5	7.92	**8.50**
Ceskomoravska Zarucni a Rozvojova	5.5	11	9.5	4.5	6.5	10	7.83	**7**
Ceskoslovenska Obchodni	11.5	2	4	8.5	2.5	1	4.92	**2**
Czech Export Bank	4	12	7.5	13	6.5	11	9.00	**11**
Equa Bank	1	8	13.5	14	4.5	14	9.17	**12.5**
GE Money Bank	3	14	7.5	6	14	7	8.58	**10**
Hypotecni banka	2	6.5	11	8.5	11	6	7.50	**6**
J&T Banka	7.5	13	13.5	12	8.5	13	11.25	**14**
Komercni Banka	5.5	5	12	2.5	2.5	3	5.08	**3**
Modra pyramida stavebni	14	3	9.5	11	8.5	9	9.17	**12.5**
PPF banka	7.5	9	2.5	2.5	1	12	5.75	**4**
Stavební Sporitelna Ceské Sporitelny	10	1	1	1	4.5	8	4.25	**1**
Unicredit Bank Czech	9	10	2.5	10	12	4	7.92	**8.50**

Republic

Source: Authors calculations

Table 4 displays the results obtained in the case of Romanian *banks for the CAMELS framework. The top five banks ranked are: RBS Bank,* **Raiffeisen Bank România, CEC Bank, Banca Comercială Română and UniCredit Ţiriac. In the case of RBS bank we must underline that, despite being a small bank, it has obtained the best ranking also in the case of assets quality, management quality and liquidity. The bottom five ranked banks are Piraeus Bank, Banca Comercială Carpatica, MKB Romexterra and ProCredit Bank, that are the smallest banks from our sample in the case of Romania.**

Table 4: **Ranking of the Romanian banks based on the CAMELS framework**

	C	A	M	E	L	S	Avg.	Rank
Alpha Bank	11	10	4	5.5	7.5	7	7.50	**8**
Banca Carpatica	8.5	12.5	13.5	11.5	3.5	13	10.42	**13**
Banca Comercială Română	8.5	13	2	2	9.5	1	6.00	**4**
Banca Românească	4	4	11	10	12.5	10	8.58	**9**
Banca Transilvania	15	8	10	3.5	12.5	5	9.00	**10**
Bancpost	6	9	6.5	11.5	3.5	8	7.42	**6.50**
BRD-GSG	14	12.5	4	1	11	2	7.42	**6.50**
CEC Bank	5	2	6.5	9	6	6	5.75	**3**
MKB Romexterra	8.5	14	12	14.5	5	14	11.33	**14**
OTP Bank Romania	1	6.5	13.5	14.5	7.5	12	9.17	**11**
Piraeus Bank	2.5	15	8,5	8	14	11	9.83	**12**
ProCredit Bank	13	3	15	13	15	15	12.33	**15**
Raiffeisen Bank România	12	5	8.5	3.5	2	3	5.67	**2**
RBS Bank	2.5	1	1	5.5	1	9	3.33	**1**
UniCredit Ţiriac	8.5	6.5	4	7	9.5	4	6.58	**5**

Source: Authors calculations

In order to have a better overview of the financial soundness and to underline the probability for bankruptcy for the banks from our sample we have used also the Z-score. Analysing the results displayed in table 5 we can draw two quick conclusions. On the one hand, during the analysed period of time the banks operating in the Czech Republic have registered a slightly higher Z score than their Bulgarian and Romanian peers. The registered differences in the case of the Z score can be attributed to the low standard deviation of the returns on average assets registered by the banks operating in the Czech Republic. This is mainly because at the end of the 1990 the Czech Republic banking sector has undergone through a severe crisis, thus banks reorganising their operations and acquiring assets that produce steady incomes rather than high volatile returns.

Table 5: **Z-score average decomposition for the banks from the analysed countries for the period 2004-2011**

Country	Bulgaria	Czech Republic	Romania
Z-score	20,04	36,19	12,78
ROAA in %	1,76	1,12	0,77
Equity/Assets (in %)	14,01	11,60	10,94
Standard deviation of ROAA (in %)	0,84	0,42	1,30

Source: Authors calculations based on Bureau Van Dijk Bankscope database (https://bankscope2.bvdep.com)

Second, we can observe that the highest ROAA is registered in the case of the Bulgarian banks followed by the Czech Republic and Romanian ones. This is in line with the income taxes that exist, namely 10% in Bulgaria, 15% in the Czech Republic and 16% in Romania. Also the Czech banks have benefited from a more steady return on assets thus, registering a higher average compared with the Romanian ones, despite the small difference in the income tax level (1% point).

5. Conclusion

The research undertaken has been focused on a sample of 40 commercial banks that operate in the CEE-3 countries, having an original dual approach and underling both their financial soundness and ability not to go bankrupt, thus the paper implicitly having a high level of added-value.

Pooling together all the obtained results, several conclusions can be drawn. First, in the case of the best ranked bank we can observe that the subsidiaries of large pan-European banking groups, especially Austrian ones like Erste and Raiffeisen, are present in the case of all the analysed countries. This can be attributed to the organisational and management strategy of these groups that are extremely focused on achieving a high level of financial soundness for all their subsidiaries. Second, we can observe that also in the top five ranked banks there are some domestic banks in the case of each CEE-3 countries, this underling that local knowledge and networking can provide these banks with the resources needed in order to have a very stable financial position. Third, we can observe that in the case of the lowest rated banks most of the time these are represented by the smallest banks from the sample for the analysed country. This is happening especially because these banks are involved in universal banking activities and have a high level of cost to customer ratio, while also any negative variation of their assets has a direct negative impact on their financial soundness indicators.

However, overall taking into account the results of the CAMELS framework and also the Z-score results we are able to conclude that the commercial banks operating in CEE-3 countries are registering a stable financial situation, the European integration process having a positive impact on their performances. This conclusion is in line with other studies on this topic from the academic literature (e.g. Ivičić, 2008). Also, in future researches it will be of interest to identify and analyse the factors that influence the evolution of the financial soundness indicators through a multiple regression analysis.

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