ТЕМЕ, г. XLII, бр. 3, јул – септембар 2018, стр. 961–977

Прегледни рад DOI: 10.22190/TEME1803961T
Примљено: 8. 3. 2017. UDK 336.71(497.11)
Ревидирана верзија: 23. 5. 2018.
Одобрено за штампу: 12. 6. 2018.

MEASURING PERFORMANCE OF THE SERBIAN BANKING SECTOR USING CAMELS MODEL

Violeta Todorović[1], Srđan Furtula[1], Danijela Durkalić[2*]

[1]University of Kragujevac, Faculty of Economics, Kragujevac, Serbia
[2]University of Kragujevac, Faculty of Hotel Management and Tourism, Vrnjačka Banja, Serbia
[*]*danijela.durkalic@kg.ac.rs*

Abstract

Realization of the undeniable role of banks in the functioning of the economic system assumes their successful business, based on the achievement of key financial performance. Interrelatedness and interdependence of bank performance indicators, their dynamic relationship, and interaction, on the one hand, as well as differences and contradictions, on the other hand, require precise monitoring and harmonization by banks, in order to achieve adequate business results and minimize negative financial developments. In this sense, it is very important to choose appropriate ways to measure and manage bank performance. A key role in this process belongs to a banking rating system, measured by CAMELS model. Therefore, the paper attempts a comprehensive analysis of bank performance measurement, using CAMELS model. The aim is to examine the possibility of applying this model to effectively measure the performance of the banking sector in the Republic of Serbia.

Key words: financial performance, liquidity, capital adequacy, profitability, CAMELS.

МЕРЕЊЕ ПЕРФОРМАНСИ БАНКАРСКОГ СЕКТОРА РЕПУБЛИКЕ СРБИЈЕ ПУТЕМ CAMELS МЕТОДА

Апстракт

Остваривање неспорне улоге банака у функционисању економског система претпоставља њихово успешно пословање, засновано на остварењу кључних финансијских перформанси. Међусобна повезаност и условљеност банкарских перформанси, њихов динамички однос и интеракционо деловање, с једне стране, као и присутне разлике и супротности, с друге стране, захтевају прецизно праћење и усклађивање истих од стране банака у циљу постизања адекватних резултата пословања и свођења негативних финансијских кретања на најмању меру. У том смислу, веома је важно изабрати адекватне начине за мерење и управљање перформансама банака. Кључну улогу у том процесу може имати рејтинг систем

банака, мерен путем тзв. CAMELS модела. Стога, рад представља покушај свеобухватне анализе мерења перформанси банака применом CAMELS модела. Циљ рада је да преиспита могућност примене наведеног модела за ефикасно мерење перформанси банкарског сектора Републике Србије.

Кључне речи: финансијске перформансе, ликвидност, адекватност капитала, профитабилност, CAMELS.

INTRODUCTION

Financial performance, as the main business efficiency indicator, is the basis for understanding the current financial position and estimating future business opportunities and development of the banking sector. To be useful and usable, available information on performance indicators needs to be reliable, comparable, and clear. Complexity of evaluating the performance of banks hinders model implementation, which increases motivation to develop new and more accurate models.

CAMELS model was developed in the USA in 1991, and has been an effective tool for measuring bank performance since then. Using CAMELS model, banking supervisory authorities and management form a bank rating system, recognized as the international rating system, which gives a picture of banking health and banking performance. Given that bank ratings are not publicly available, researchers and scholars employ more and more efforts to get to know this composite rating, and, thus, forecast information about the performance of each bank. In this sense, they get more realistic information about ratings, available to supervisory authorities.

In line with the identified dimensions of the considered problem area, the research subject focuses on the analysis of financial performance of banks, using CAMELS model. More specifically, research centers on the analysis of key financial performance indicators of the banking sector in the Republic of Serbia, using CAMELS model. Respecting the above-mentioned subject, the main goal is to test the validity of the CAMELS model in the banking sector of the Republic of Serbia for effective forecasting, analysis, control, and management of financial performance.

With reference to the defined subject and goal of research, the work tests the following hypotheses:

H1: CAMELS model, as one of the most common composite rating models, used by regulatory and supervisory authorities, can warn of changes in the performance of banks and the likelihood of problems in the banking system.

H2: If the performance of the banking sector of the Republic of Serbia is perceived as a whole, then the banking sector of the Republic of Serbia demonstrates a satisfactory level of performance.

To test the starting hypotheses, methodology for measuring the banking performance using the *Statistical Package for the Social Sciences (SPSS)* will be used, relying on descriptive statistics of the research subject. The study first consults relevant literature dealing with different CAMELS model methodologies, based on theoretical and practical application in a specific banking system.

LITERATURE REVIEW AND METHODOLOGY

The banking sector is the engine of economic development of each country, given its efficiency in the process of transfer of available funds and using the limited financial resources most productively (Vunjak, Davidović & Stefanović, 2012). Available literature shows that the CAMELS model is very common in evaluating bank performance. In addition, as already noted, procedure of determining and assigning bank rating is not publicly available. For some banks, CAMELS rating is confidential information, known only to management and the competent authorities, and is used exclusively for bank monitoring. Given that direct rating is unavailable to the public, it has been enough of a challenge to develop different aspects of this model. Efficiency of the banking sector financial performance is the basis for economic growth and development (Saif-Alyousfi, Saha & Md-Rus, 2017).

Gilbert, Meyer and Vaughan (Gilbert, Meyer & Vaughan, 2002) developed the advanced CAMELS model, which can predict a decline in bank ratings from 1 and 2 to 3, 4, 5, observing banks over a two-year period. On the basis of this research they complemented CAMELS model with SEER model for identifying problem banks with declining rating.

Whalen (Whalen, 2005) developed a proportional hazard model, designed to predict the likelihood that a bank with low-risk status will be downgraded to a high-risk bank. The risk dichotomy was carried out based on CAMELS composite rating, with a 2 rating separating low-risk and high-risk bank groups.

Derviz and Podpiera (Derviz & Podpiera, 2008) investigated the possibility of the public and supervisors to predict changes in bank ratings in the period after the change of government in the Czech Republic. Based on the example of Czech banks, using CAMELS rating model, they found that it is possible to predict some of the CAMELS model variables, such as capital adequacy, VaR, and leverage, corresponding to variables set by the United States: leverage and the share of total loans in total assets.

Dincer et al. (Dincer, 2011) from Turkey analyzed the state of the Turkish banking sector after the crisis period, classifying banks into three categories: state-owned banks, private banks, and foreign banks. Using CAMELS indicators, they recorded positive performance of all three groups of banks in the period from 2001 to 2008. As a key reason for

good performance during the crisis period, they noted a solid liquidity ratio.

Indian author Nandi (Nandi, 2013) analyzed the development component of banks in India, distinguishing between private and state-owned banks. The results showed that, in a highly competitive global environment, it is imperative for the banking sector to demonstrate strong performance on the basis of various parameters. Findings arising from the CAMELS model are particularly interesting, as they show better performance of banks in the public sector than private banks. Factors responsible for the declining performance of private banks are dependence on interest income, escalation of operating costs, and rapid expansion of branches.

CAMELS model is very common in Indian literature. Kaur (Kaur, 2015) analyzes financial performance of the banking sector in India and identifies the factors that predominantly affect financial performance of banks. The results show that the dominant factors that cause 95% of changes in return on assets, as compared to the mean value, are income per employee, loan-to-deposit ratio, debt-to-equity ratio, capital adequacy ratio, and total investment to total assets ratio. What is more, income per employee individually affects 65.5% of changes in return on assets of banks in relation to the mean values.

CAMELS methodology is a standardized process of determining qualitative and quantitative performance rating, weighing corresponding rating, and establishing banking sector rating. It is based on calculating the respective ratios that represent relationships between individual balance sheet and income statement items in the banking sector. As a good basis for the positioning of the banking sector, CAMELS methodology quantifies individual areas (Capital adequacy, Assets, Management quality, Earnings, Liquidity, and Sensitivity to market risk) and establishes the analytical basis for banking performance comparison. CAMELS methodology in the Republic of Serbia is calculated using 16 CAMELS indicators, with the help of descriptive statistics (measures of central tendency and dispersion) to analyze the above CAMELS indicators and monitor their value during the period 2008-T2 2016. The used indicators are grouped into a set of composite indicators, and, as such, presented as mean values of indicators for the given period:

C (C1, C2, C3); A (A1, A2); M (M1), E(E1, E2, E3);
L(L1, L2, L3, L4); S (S1, S2, S3)

A method for determining a single rating is not strictly formalized, but means synthesizing individual ratings into one. On the basis of a given rating and subjective assessment of persons responsible, frequency of the composite CAMELS rating is determined, where banks with a rating of 3, 4, 5 are monitored annually, and those with a rating of 1 and 2 once every two years (Hunjak & Jakovčević, 2003).

CAMELS RATING RESULTS IN THE BANKING SECTOR OF THE REPUBLIC OF SERBIA

Since 2004, the National Bank of Serbia applies CAMELS rating system to anticipate early risk. Although the entry into force of new regulations and Basel 2 standards altered the existing supervisory approach and a new methodological framework, reference documents do meet CAMELS methodology. Serbian banking sector and the National Bank of Serbia in the *Review of the dynamics of financial stability indicators for the Republic of Serbia disclose* indicators by CAMELS methodology.

Table 1. Review of parameters of the banking sector of the Republic of Serbia (in billions of RSD in %)

	2005				**2010**				**2016**			
	Number of banks	Assets	Capital	Employees	Number of banks	Assets	Capital	Employees	Number of banks	Assets	Capital	Employees
Banks owned by domestic entities – state	13	165	-	-	8	394	80	7230	6	565	88	5168
Banks owned by domestic entities – private	16	141,5	-	-	5	187	54	1555	1	178	54	610
Banks owned by foreign persons	12	229,4	-	-	21	1656	336	22241	23	2300	488	18397
Total	41	535,9	100	23566	34	2237	470	31026	30	3043	630	24175

Source: National Bank of Serbia, Banking Sector in Serbia – First Quarter Report 2005, 2010, and 2016

The banking sector shows a drastic change when it comes to basic parameters. Table 1 first shows that the number of banks decreased from 41 in 2005 to 30 banks in 2016. What might also be interesting is the significant reduction in private domestic banks (from 16 in 2005 to 1 in 2016) and increase in foreign banks (from 12 in 2015 to 23 in 2016.). Bank equity has increased more than five times, as well as total assets, while the number of employees increased, to finally decrease to 25175 employees in 2016.

Capital Adequacy Ratios

The banking sector in Serbia is adequately capitalized, both in terms of the achieved level of capital adequacy ratio, and in terms of the regulatory

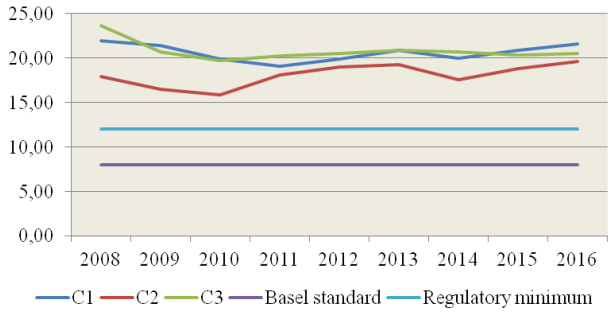
capital structure. Capital adequacy has improved, and in the first quarter of 2016 amounted to 21.6%, even though the regulatory framework provided for in the Basel regulations was 12%. When it comes to regulatory capital, its composition should be analyzed as well, taking into account that for the most part (90%) it consists of the basic capital of highest quality. At the end of the first quarter of 2016, capital adequacy ratio in the banking sector in Serbia was 21.6%, which is well above the regulatory minimum (12%), as well as the Basel standard minimum (8%) (NBS, 2016).

Table 2. Basic capital adequacy ratios of the banking sector in Serbia in the period 2008 - T2 2016 (in %)

	Mean	Min.	Max.	Relative standard deviation
Regulatory capital to risk-weighted assets (C1)	20,62	19,1	21,6	0.941777
Share capital to risk-weighted assets (C2)	18,08	15,9	19,6	1.25874717
Equity to balance sheet assets (C3)	20,79	19,7	23,6	1.11068047

Source: Authors' calculation based on NBS data

According to the National Bank of Serbia report analysis, there are three important capital adequacy ratios, namely: regulatory capital to risk-weighted assets, share capital to risk-weighted assets, and equity to balance sheet assets. Judging by descriptive statistics, it can be concluded that the Serbian banking sector is adequately capitalized, as the range of values for the period 2008 to 2016 for all observed indicators was above 12%, as prescribed by regulatory authorities. Aggregate indicators for this sector can be represented graphically as follows:



Graph 1. Capital adequacy ratio in the banking sector in Serbia in the period 2008 – T2 2016 (in %)
Source: Authors' calculation based on NBS data

As Graph 1 shows, capital adequacy is sufficient according to all three indicators, recording growth in the last period, 2015 – 2016. Capital

adequacy is achieved, both by national regulatory minimum and Basel Committee standards.

Asset Quality

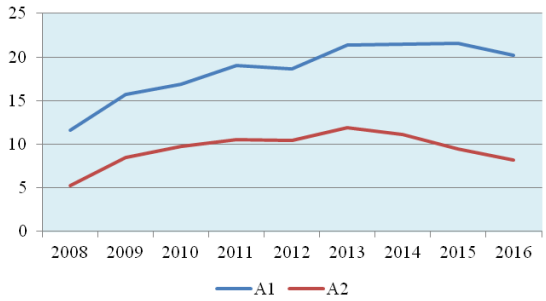
Increase in non-performing loans in 2013, despite the new laws that stipulated payment deadline for business entities of 60 days, and for the state of 45 days, resulted from a generally unfavorable business climate, particularly for large corporate clients, who long resisted the effects of long-term economic crisis. The share of high-risk loans in total loans at the sector level in 2015 amounted to 21.6% and was the maximum over the observed eight-year period. This scenario is the result of growth in high-risk loans and a decrease in bank lending. Also, as Anić, Malović & Misić (2015) stated, Serbian corporate sector's NPL ratio, however, appears to have been mainly driven by nominal exchange rate trajectory (coupled with inflation dynamics).

Table 3. Basic asset quality ratios of the banking sector in Serbia in the period 2008 – T2 2016 (in %)

	Mean	Min.	Max.	Relative standard deviation
Gross non-performing loans to total gross loans (A1)	18.5	11.6	21.6	3.3200151
Net non-performing loans to total net loans (A2)	9.47	5.3	11.9	1.9538424

Source: Authors' calculation based on NBS data

According to CAMELS indicators, asset quality is generally measured by the share of non-performing loans. In the case of the Republic of Serbia, there are gross and net non-performing loans. Gross non-performing loans had the highest value in 2015, as stated, while their mean value was 18.5. More detailed trend is presented graphically:



Graph 2. Asset quality indicators of the banking sector in Serbia in the period 2008 – T2 2016 (in %)

Source: Authors' calculation based on NBS data

Management Quality

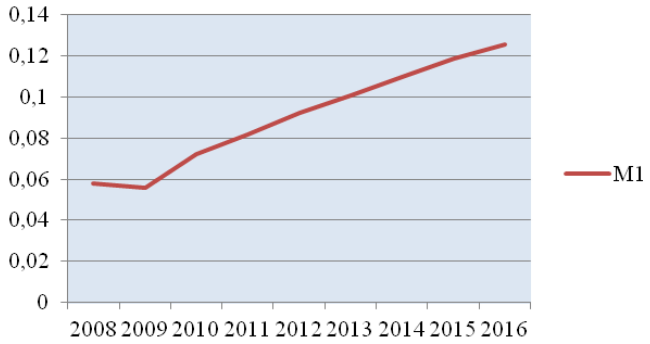
Management quality (M) refers to the board of directors and senior managers' ability to identify, measure, and control banking risks, whereby regulators emphasize the existence and use of certain risk management processes (Todorović, 2010). The indicator that measures the efficiency of the banking sector management is the ratio of total assets to number of employees. Basically, management quality indicators can be seen as a ratio between the categories associated with employees and their earnings and banking sector assets.

Table 4. Management quality indicators of the banking sector in Serbia in the period 2008 – T2 2016

	Mean	Min.	Max.	Standard deviation
Total assets in billions of RSD/number of employees (M1)	0.0907	0.0559	0.1259	0.0255

Source: Authors' calculation based on NBS data

This indicator exhibits a significant increase, reaching mean value of 0.0907 over the observed nine-year period. The maximum value was 0.1259, and minimum 0.0559. Detailed trend of this indicator by years can be seen in the graph:



Graph 4. Management quality indicators of the banking sector in Serbia in the period 2008 – T2 2016
Source: Authors' calculation based on NBS data

The chosen indicator shows an increase of its value, which may indicate an improvement of management quality of the banking sector in Serbia. However, its cause lies in a decrease in the number of employees (from 30,554 employees in 2008 to 24,175 employees in 2016) at the whole sector level, as well as increase in total assets of the banking sector of the Republic of Serbia. The risk of inadequate management decisions

appears as a significant component of the total risk to which the banking sector is exposed. Yet, of all the indicators, a direct impact of this risk is difficult to quantify because it is necessary to demonstrate knowledge of a broad set of indicators for the overall banking sector, which is not available.

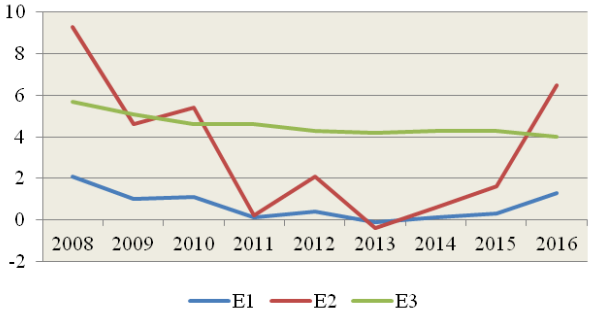
Earning Capacity

Earning capacity measures the bank's ability to maintain and increase its net worth through earnings from operating activities (Sarker, 2015). Benchmark values of bank's profitability should be noted first: if the value of ROA is less than 0.5%, bank's profitability is considered to be poor, if it ranges between 0.5% and 1%, then one can say that it is average profitability, and if the value of ROA ranges between 1% and 2%, then it is certainly a very profitable financial institution (Alihodžić, 2015). In the Republic of Serbia, return on assets (ROA) in 2015 was 0.3%, and 0.1% in 2014. Return on equity (ROE) in 2015 was 1.6%, and 0.6% in 2014. Profitability of banks declined in 2016, primarily as a result of pressure on interest margin and growing cost of risk, so ROA was 1.3%, and ROE 6.5%.

Table 5. Basic indicators of profitability of the banking sector in Serbia in the period 2008 – T2 2016

	Mean	Min.	Max.	Standard deviation
Return on assets (E1)	0.7	-0.1	2.1	0.722842
Return on equity (E2)	3.322222	-0.4	9.3	3.302566
Interest margin to average balance sheet assets (E3)	4.566667	4	5.7	0.52915

Source: Authors' calculation based on NBS data



Graph 5. Profitability of the banking sector in Serbia in the period 2008 – T2 2016
Source: Authors' calculation based on NBS data

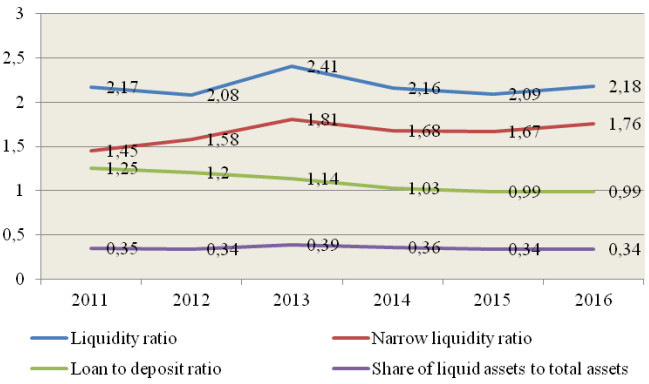
Recovery dynamics of profitability indicators will largely depend on real sector recovery, as well as business policy of banks, which currently

points to refraining from credit growth and investment in the most liquid, risk-free form of investment (such as repo securities of the National Bank of Serbia and government bonds of the Republic of Serbia). In the long term, sustainable recovery of profitability can only be the result of credit expansion based on an adequate risk management process.

Liquidity of Serbian Banking Sector

Liquidity, as a very important bank performance indicator, shows a satisfactory level, which is consistent with the needs for liquid assets in operations. Liquidity risk is the risk that the bank will not be able to finance credit commitments or meet the demand at reasonable cost (Gilbert, Meyer & Vaughan, 2002).

The banking sector in Serbia is characterized by extremely high levels of liquidity by all reference criteria. At the end of the first quarter of 2016, the average monthly liquidity ratio of banks was 2.18, which is a slight increase compared to the previous quarter, when it stood at 2.09. The indicator was well above the statutory minimum of 1.0. Narrow liquidity ratio also increased, from 1.67 to 1.76 (minimum being 0.7). The share of liquid assets in total balance sheet assets of the banking sector in recent years was stable and ranged between 30% and 40% (at the end of the first quarter of 2016 it amounted to 34.2%) (NBS, Quarterly Report, 2016).



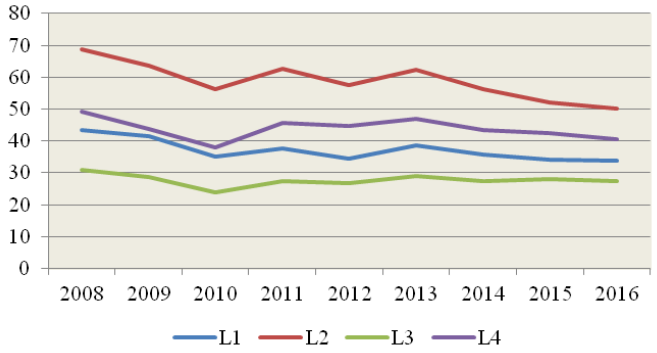
Graph 6. Liquidity of the banking sector in Serbia in the period 2011 – T2 2016
Source: NBS

According to the National Bank of Serbia report, in particular *Review of the dynamics of financial stability indicators for the Republic of Serbia*, there are different liquidity ratios. In this paper, the focus is primarily on standard liquidity ratios, as well as those used in accordance with CAMELS methodology.

Table 6. Standard liquidity ratios of the banking sector in Serbia in the period 2008 – T2 2016

	Mean	Min.	Max.	Standard deviation
Liquid assets to total balance sheet assets (L1)	37.15556	33.8	43.3	3.390469
Liquid assets to short-term liabilities (L2)	58.85556	50.3	68.6	5.903412
First-order liquid assets to total balance sheet assets (L3)	27.75556	23.8	31.1	1.95711
First-order liquid assets to short-term liabilities (L4)	43.88889	38.1	49.3	3.340451

Source: Authors' calculation based on NBS data



Graph 7. Liquidity ratios of the banking sector in Serbia in the period 2008 – T2 2016
Source: Authors' calculation based on NBS data

In the National Bank of Serbia reports, in addition to standard liquidity ratios, there is data on liquidity obtained by analysis of liquid assets to total balance sheet assets, liquid assets to short-term liabilities, first-order liquid assets to total balance sheet assets, and first-order liquid assets to short-term liabilities. Although the overall liquidity ratio exceeds 2%, these indicators in 2013 decreased their values. Turbulent developments in liquidity in the banking sector in Serbia were particularly pronounced in periods of crisis, in 2009 in 2013, when the crisis effects on the world financial market spilled over the banking sector of Serbia.

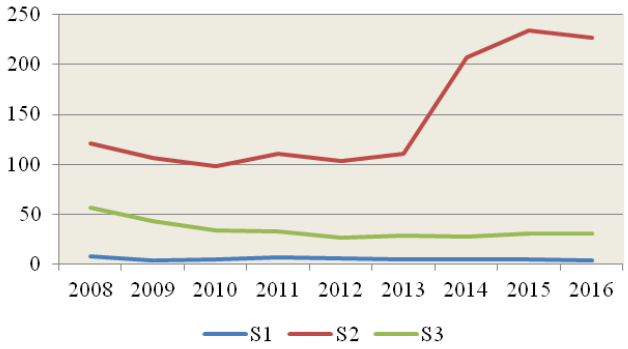
Sensitivity to Market Risk

The National Bank anticipates and controls market risk of the Serbian banking system by sensitivity to market risk indicators from the domain of its methodology. These indicators are: total net open foreign exchange positions to regulatory capital, off-balance sheet items to total balance sheet assets, and off-balance sheet items classified to total balance sheet assets classified.

Table 7. Basic indicators of sensitivity to market risk of the banking sector in Serbia in the period 2008 – T2 2016

	Mean	Min.	Max.	Standard deviation
Total net open foreign exchange position to regulatory capital (S1)	4.766667	3.6	7.4	1.32382
Off-balance sheet items to total balance sheet assets (S2)	146.5667	97.7	234.1	57.80039
Off-balance sheet items classified to total balance sheet assets classified (S3)	34.33333	26.1	56.2	9.595311

Source: Authors' calculation based on NBS data



Graph 8. Indicators of sensitivity to market risk of the banking sector in Serbia in the period 2008 – T2 2016
Source: Authors' calculation based on NBS data

In addition, sensitivity to market risk of the banking sector in Serbia is also shown in overview of long and short foreign exchange positions for euro and through foreign exchange risk. Foreign exchange risk of the banking sector is at a level of 3.20%. Thus, foreign exchange risk of the banking sector ranged in the last period from 0.5% to 3%, which is far below regulatory maximum of 10% of capital.

DISCUSSION OF RESULTS

Taking into account all the analyzed indicators, a composite review of variables used in the analysis of CAMELS model can be formed:

Table 8. Composite review of CAMELS model variables in the Republic of Serbia in the period 2008 – T2 2016

Indicator	Average value of indicator
Regulatory capital to risk-weighted assets (C1)	20,62
Share capital to risk-weighted assets (C2)	18,08
Equity to balance sheet assets (C3)	20,79
Gross non-performing loans to total gross loans (A1)	18.5
Net non-performing loans to total net loans (A2)	9.47
Total assets in billions of RSD/number of employees (M1)	0.0907
Return on assets (E1)	0.7
Return on equity (E2)	3.322222
Interest margin to average balance sheet assets (E3)	4.566667
Liquid assets to total balance sheet assets (L1)	37.15556
Liquid assets to short-term liabilities (L2)	58.85556
First-order liquid assets to total balance sheet assets (L3)	27.75556
First-order liquid assets to short-term liabilities (L4)	43.88889
Total net open foreign exchange positions to regulatory capital (S1)	4.766667
Off-balance sheet items to total balance sheet assets (S2)	146.5667
Off-balance sheet items classified to total balance sheet assets classified (S3)	34.33333

Source: Authors' calculation

Based on these indicators, it is possible to draw conclusion about operations and financial health of the banking sector in the Republic of Serbia. First, it is adequately capitalized, and capital is far above the prescribed minimum. The impact of foreign exchange and interest rate risk is practically negligible, and the absence of liquidity risk is almost certain. Through loans with variable interest rates modeled on Belibor, Euribor, and Eurlibor interest rate, risk is transferred to clients, and the other factor affecting the low level of interest rate risk is negligible share of trading in securities in total assets. The problem of the Serbian banking sector is high level of credit risk, which is reflected in slightly lower asset quality and share of non-performing loans in total assets. Due to the transfer of interest rate risk to clients, this way of doing business affects the fulfillment of obligations towards clients. Although there are loans in default of over 90 days, it can be said that the banking sector is isolated from market risks and that these risks do not pose a threat to stable operations of the banking sector in Serbia.

CONCLUSION

CAMELS rating system, like other rating models, is based on the analysis and testing of financial indicators of banks, measuring current or past banking performance. Due to bank risks, it is necessary to detect the bank problem on time, which will facilitate reaching solution. Along with assessing bank quality through quantitative indicators, it is necessary to supplement objective measurement with subjective opinions of banking experts, to ensure that information about the health of banks is complete. Nevertheless, such information is not available to the public, leading to the development of performance measurement models.

Upon using CAMELS model and examining literature and research on this rating system, one can conclude that this model is widely used in banking operations. Together with Basel regulations, it significantly contributes to the creation of benchmark values for individual banks and the entire financial sector. Although there is some hidden information in terms of this model, various modern statistical tools may very well reflect it in reality. This confirms the first hypothetical framework, which relates to improving individual banks' performance by monitoring the composite rating. Thus, this model, focusing on monitoring bank performance, can alert to changes in bank performance and the likelihood of problems in the banking system.

Looking at the banking sector in Serbia, one can see that performance indicators in most cases increased and changed in relation to previous years. Nevertheless, there are some problems. Banks have high reserves of liquid assets, but also opt to invest in low-risk short-term loans. For this reason, liquidity of the banking sector was significantly above the prescribed limits. This conclusion is in line with the proof of the authors Marinković & Radović (2014) which concluded that Serbian banks with an above-average equity-to-asset ratio tend to report higher net interest margin, because of "risk aversion". This loan structure contributed to banking sector stability, and indirectly led to a general fall in profitability given a minimum rate of return on investment. Nevertheless, in 2016, profitability indicators showed slight growth, so their satisfactory level can be expected. Looking at the composite overall performance indicator, it can be said that almost all or most of performance indicators were satisfactory or even above the regulatory minimum. This proves the second hypothesis. In particular, the liquidity of the banking sector in Serbia was particularly accelerated after 2008. Bošnjak, Hassan & James (2017) reach a similar conclusion for the banking sector in Serbia for the period 2006-2016 when ROA started to rise, particularly after 2013.

Given that information about the CAMELS rating of individual banks is not public or commercially available, this research has practical limitations. It is at the same time the limitation of this model, as it is the subjective assessment of researchers, since the real CAMELS rating is not publicly available. However, although supervisors can benefit from public monitoring

of banks in the form of disclosure, one must take into account the costs of supervisors and public disclosure. If CAMELS rating for each bank was fully available to the public, exchange of information between supervisors and bankers would change and would negatively affect the monitoring of banks, and, perhaps, public opinion. In order to make up for this deficiency, new models have been developed, which measure bank risks and complement CAMELS model, namely Monte Carlo simulation of risk or AHP method for bank ranking. In order to adequately consider risks and spot problem banks, new models for measuring bank performance may be the subject of future research.

REFERENCES

Anić, A., Malović, M., Misić, V. (2015). Macroeconomic environment and NPLs–evidence from Serbia and the Czech Republic, *TEME: Casopis za Društvene Nauke*, Vol. 39, No. 1, pp. 175-190.

Алихоџић, А., (2015), Међусобна условљеност перформанси банкарског и реалног сектора Републике Србије [Mutual dependence of banking and real sector performance in the Republic of Serbia], *Банкарство, Vol. 44, No.* 2, стр. 246–273.

Bošnjak, A., Hassan, A., James, K. (2017). Analysis of the Banking Sector Performance in Bosnia and Herzegovina, Montenegro and Serbia Before and After the Global Financial Crisis, *Economics*, Vol. 5, No. 2, pp. 83-101.

Вуњак, Н., Давидовић, М., и Стефановић, М., (2012), Утицај глобалне финансијске кризе на перформансе банкарског сектора Србије [The impact of the global financial crisis on the performances of the Serbian banking sector], Vol. 36, No. 3, *Теме,* Ниш, стр. 1279–1298.

Gilbert, R. A., Meyer, A. P., Vaughan, M. D, (2002), Could a CAMELS downgrade model improve off-site surveillance?, *Review*, *84*,

Derviz, A., Podpiera, J., (2008), Predicting bank CAMELS and S&P ratings: the case of the Czech Republic, *Emerging Markets Finance and Trade*, No. *44*(1), pp. 117-130.

Dincer, H., Gencer, G., Orhan, N., Sahinbas, K. (2011), A performance evaluation of the Turkish banking sector after the global crisis via CAMELS ratios, *Procedia-Social and Behavioral Sciences*, Vol. *24*, pp. 1530-1545.

Kaur, P. (2015), A Financial Performance Analysis of the Indian Banking Sector Using CAMEL Model, *IUP Journal of Bank Management*, Vol. 14, No. 4, pp. 19-34.

Marinković, S., Radović, O. (2014), Bank net interest margin related to risk, ownership and size: an exploratory study of the Serbian banking industry, *Economic research*, Vol. 27, No. 1, pp. 134-154.

Nandi, J. K. (2013), Comparative Performance Analysis of Select Public and Private Sector Banks in India: An Application of CAMEL Model, *Journal Of Institute Of Public Enterprise*, Vol.*36*, pp.1-29.

National Bank of Serbia, (2016), Quarterly review of the dynamics of financial stability indicators for the Republic of Serbia, Financial stability department: https://www.nbs.rs/internet/english/18/pregled_grafikona_e.pdf

Sarker, A., (2005), CAMELS rating system in the context of Islamic banking: A proposed 'S'for Shariah framework, *Journal of Islamic Economics and Finance*, No. *1*, pp. 78-84.

Saif-Alyousfi, A. Y., Saha, A., & Md-Rus, R. (2017), Profitability of Saudi Commercial Banks: A Comparative Evaluation between Domestic and Foreign Banks using CAMEL Parameters, *International Journal of Economics and Financial Issues*, Vol. 7, No. 2, pp. 477-484.

Тодоровић, В., (2010), Регулатива банака и банкарске кризе [Regulations of banks and the banking crises], Докторска дисертација, Економски факултет, Крагујевац.

Tihomir Hunjak, T., Jakovčević, D., (2003), Višekriterijski modeli za rangiranje i uspoređivanje banaka [Multicriterial models for ranking, and comparing banks], *Zbornik Ekonomskog fakulteta u Zagrebu*, Vol. 1, No 1, str. 43–60.

Whalen, G. (2005), *A hazard model of CAMELS downgrades of low-risk community banks*, OCC Economics Working Paper, Washington,

National Bank of Serbia, Banking Sector in Serbia – First Quarter Report 2005, 2010, and 2016: http://nbs.rs/internet/latinica/55/55_4/kvartalni_izvestaj_I_16.pdf

National Bank of Serbia, (2016), Quarterly review of the dynamics of financial stability indicators for the Republic of Serbia, Financial stability department: https://www.nbs.rs/internet/english/18/pregled_grafikona_e.pdf

МЕРЕЊЕ ПЕРФОРМАНСИ БАНКАРСКОГ СЕКТОРА РЕПУБЛИКЕ СРБИЈЕ ПУТЕМ CAMELS МЕТОДА

Виолета Тодоровић[1], Срђан Фуртула[1], Данијела Дуркалић[2]
[1]Универзитет у Крагујевцу, Економски факултет, Крагујевац, Србија
[2]Универзитет у Крагујевцу, Факултет за хотелијерство и туризам, Врњачка Бања, Србија

Резиме

На основу банкарских извештаја, менаџмент банке може да процени општи квалитет банке користећи одговарајући рејтинг систем. Најпознатији рејтинг систем развијен је у Америци од стране Федералне корпорације за осигурање депозита (Federal Deposit Insurance Corporation FDIC) под називом CAMELS. Суштина овог модела је та да се рејтинг банке одређује на основу шест компоненти које одражавају перформансе банке: адекватност капитала, квалитет активе, квалитет менаџмента, добитак, ликвидност и осетљивост на тржишни ризик. Овај модел представља свеобухватан начин мерења перформанси банака у САД-у. Данас овај рејтинг систем примењују и друге земље у мерењу својих перформанси. Сама композиција модела разликује се од земље до земље, у складу са показатељима који се израчунавају у датој земљи. Међутим, сви показатељи одражавају дати модел кроз поменутих шест компоненти.

Сузбијање настанка банкарске кризе може бити мање или више успешно, што зависи од мера које се предузимају за њено спречавање. Како би се кризни периоди унапред уочили, потребно је непрестано праћење банкарских перформанси. Имајући у виду наведено, у раду се анализирају изабрани репрезентативни показатељи перформанси банкарског система Републике Србије. Кључни циљ рада је да се утврде показатељи перформанси банкарског сектора Србије који одговарају CAMELS методологији како би се оценило стање банкарског сектора и преиспитале евентуалне мере за решавање проблема. Стабилност финансијског система и

сигурност депонената огледаће се такође кроз приказ основних перформансних показатеља банкарског сектора.

Проблеми банкарског сектора веома су опасни и имају тенденцију да прерасту у проблеме светских размера. На основу историјског искуства, данас је супервизија и контрола банака један од важних питања. У том смислу, резултати анализе CAMELS методологије у банкарском сектору Републике Србије указаће на кључне показатеље стабилности банкарског сектора у периоду након финансијске кризе 2008. године. Резултати ће показати повољно кретање перформанси банкарског сектора Републике Србије, али и нужно непрестано праћење, нарочито показатеља ликвидности и осетљивости на тржишни ризик. Ова методологија показаће се као веома користан алат који може да упозори на промене у перформансама банака и вероватноћу настанка проблема у банкарском систему, али и као корисно средство за информисање јавности о актуелним променама у банкарском систему.