Concentration Measuring Techniques in Banking Sector- Lorenz Curve and Gini Coefficient

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ABSTRACT

The paper presents the indicators of market concentration in the banking sector with a focus on the Lorenz curve and the Gini coefficient. The authors present the results of the empirical research of concentration levels in the banking sector in selected countries in the CEE region (Serbia, Croatia, Montenegro, Bosnia and Herzegovina, Macedonia, Bulgaria, Romania and Albania) in the period 2007-2012. The level of market concentration can be exploited and operationalized by using different concentration indicators. The contribution of this research is reflected in the comparative empirical analysis of the results of our previous research that was focused on quantification of the most frequently used indicators of concentration (Concentration ratio 4 and Herfindal-Hirshman index), and the results obtained using the Lorenz curve and the Gini coefficient. The paper analyzes the level as well as variability of these indicators and tests the degree of their correlation. Individually observed, concentration indicators have relatively low capacity to present the real nature of competition in the banking sector in the analyzed countries as well as to provide a good estimate of possible future trends. The results of our analysis indicate that, for the purpose of a more precise and better understanding of the relevant issues of market concentration in the financial sector, several indicators of concentration need to be analyzed simultaneously. Additionally, improvement of methodology should provide a more reliable basis for a precise definition of adequate policies and legislation in this area.

Key words: *level of concentration, Gini coefficient, Lorenz curve, banking sector, CEE region, economic crisis*

JEL Classification: G21, G01

INTRODUCTION

Concentration is a measure of market power, whereby market power can be defined as a company's ability to increase the price of a product / service without reducing total sales. In this context, competitive business in the industry is distorted in uncontrolled economic systems. This market position can lead to monopoly behavior, which is reflected in unjustified price increases (and extra profit), lower product / service quality, the lack of innovativeness, the use of cheaper and low-quality raw materials in the production process (Barjaktarović, Filipović & Dimić, 2013).

The concept of concentration in the financial sector defines the form of interconnection of institutions whereby they come under common control thus creating a certain level of economic

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unity which, by the time of association, did not exist (Šubić, 2009). Larger part of the theory of industrial organization can be applied in the financial system. However, the banking sector is part of a group of specific business branches where oligopoly structure can be found in the market. The reason for this kind of market structure lies in the fact that banks aim at achieving profit margins justifying shareholder investments, thus attracting a higher level of capital. Perfect competition in the financial sector is not market-sustainable, because of the following:

- Endangering the profit margins of financial institutions. Under the conditions of perfect competition in the market, financial institutions would achieve minimum profits, which would prevent the accumulation of capital necessary to protect against potential losses.

- The problem of asymmetry of information is raised and the moral hazard increases. Financial institutions operate under "too big to fail" principles, take on greater business risk because they are certain that in the event of an emergency, the state will stand in their defense.

- Increasing the level of passive rates in the banking sector with the aim of attracting as many customers as possible. The increase in passive interest rates would have an effect on an increase in active interest rates.

The scientific literature adopts several reasons which can lead to the increased concentration in the financial system. Hawkins & Mihaljek (2001) cite the following groups of motives which encourage institutions to consolidate in the financial sector:

- Benefits (economy of scale, organizational activity, diversification of risks);

- Economic reasons (motives for checking the level of concentration that emerge after the crisis or during the increase in the business cycle);

- Other motives (defending against the takeover and managerial motivation to capitalize).

The objective of the paper is to elaborate characteristics of Gini coefficient as a measure of the concentration, to quantify Gini coefficient in the banking sector in selected CEE countries as well as to compare the results with findings of our previous research (Barjaktarović, Filipović & Dimić, 2013; Dimić, 2015; Dimić, 2018; Dimić, Paunović & Tešanović, 2019) which was based on most frequently used indicators of concentration (Concentration ratio 4 and Herfindal-Hirshman index). In this context, we also test the degree of their correlation.

The main hypothesis of the paper is that there is a high average value of Gini coefficient, indicating the relatively high level of concentration in the banking sector of analyzed countries during the period 2007-2012.

The auxiliary hypotheses are:

H1: There are significant differences in the degree of correlation between individual concentration indicators (CR4, HHI and G).

H2: Degree of concentration in the banking sector is poorly correlated with the level of economic development.

The paper will be structured as follows: within the first section previous research that relates to indicators of concentration will be elaborated followed by the methodology of research and data collecting. Within the third section the results of our survey will be presented. Finally, the conclusion and recommendations will be given.

PREVIOUS RESEARCH

The turbulence of the environment and market changes have led to the need for business entities re-examine themselves and to design their business strategy in order to gain competitive advantage in the market (Raičević & Medenica-Mitrović, 2018). In this context, the degree of concentration represents an important structural variable in any business area. Various levels of concentration of individual industries or companies in the economic branches

are the first indicator of the market structure (Dimić, 2015). In this context, the significance of the indicator of concentration is found in the interpretation of structural changes in the market. Concentration indicators reflect changes in the level of market concentration, which are the consequence of entering or leaving of the companies from the branch, as well as merging of companies in the industry. Concentration indices are therefore considered as the starting point for conducting anti-monopoly policy, whereby the value of concentration indicators can be used in the decision-making process on whether to approve the uniting of companies.

Concentration indices belong to a group of indicators of structural approach, as they describe the state and changes in the market structure (Dimić, Paunović & Tešanović, 2019). Different authors have indicated certain characteristics that the indicators of concentration need to possess. Hall & Tideman (1967) cited the following characteristics of the concentration index in their research:

- They should be one-dimensional, which practically means that they should be unambiguous in order to be comparable between different branches and different times.
- They should be independent of the size of the branch indicating their inter-comparability. Practically speaking, for measuring of concentration the absolute value of the variables is not important, but their distribution among the participants in the market
- Concentration indices affect the changes in market share of the corporation. Thus, the shift of market share from small to larger companies increases, and the shift from bigger to smaller reduces the value of the concentration index.
- Concentration index should range from 0 to 1. This characteristic is not ultimate, but it is desirable because the indices in such a state are more useful for analysis.

Depending on the purpose of the research, market concentration can be measured by numerous indicators. In their scientific paper Bikker & Haaf (2000) presented theoretical explanations of concentration indicators: Concentration ratio, Herfindal-Hirshman index, Entropy measure, the Lorenz curve, the Gini coefficient, the Comprehensive industrial concentration index CCI, Hannah and Kay (HKI), Hall-Tideman index (HTI), Hause Index (H_a).

Table 1. Indicators of market concentration

Index title	Tag and interval value	Index value interpretation
Concentration ratio	$1/n \le C_r \le 1$	The value of the index is approaching 0 when a larger number of identical entities are present on the market, and value 1 takes the situation when the sum of "r" entities make the entire industry.
Herfindahl-Hirschman index	$1/n \le HHI \le 1$	The higher value of the index indicates the higher concentration. In case of a monopoly, it is worth 10,000.
Entropy measure	$0 \le E \le \log n$	Greater entropy value indicates lower concentration. In case of a monopoly, the value of the index is equal to 0.
Lorenz curve	-	Indicates the distribution of population in population. The larger the concentration the further the curve from the direction of even distribution.
Gini coefficient	$0 \le G \le 1$	The bigger the coefficient the larger the conentration. In case of total uneven distribution it amounts to 1
Comprehensive industrial concentration index	$0 \le CCI \le 1$	The value of the index ranges from 0 to 1. Value 1 occurs in case of a pure monopoly.
Hannah and Kay index	HKI; $\alpha > 0$; $\alpha \neq 1$	The lowest values of α parameter emphasize the influence of small companies, while the highest values of α parameter point out the influence of big companies on concentration.

Index title	Tag and interval value	Index value interpretation
Hall-Tideman index	0≤HTI≤1	Value close to 0 means the presence of a larger number of banks of the same size, while the index value of 1 signals the presence of a monopoly.
Hause index	0≤H≤1	Index is equal to the value of 1 in case of a monopoly, while the value 0 occurs in the presence of an infinite number of identical banks in the market.

Source: Dumićić et al. (2012), Ljubaj (2005)

The most commonly used concentration measurement techniques are the Concentration ratio 4 (CR4) and Herfindahl-Hirschman index (HHI). These techniques are widely accepted and used by referent institutions that analyze, monitor and make decisions regarding the control of the degree of concentration. In this context, one of our previous surveys could be a good basis for a broad comparative analysis of concentration indicators.

In the analysis that is the subject of this paper, the aforementioned commonly used techniques are added a theoretical and methodological review of the Lorenz Curve and the Gini coefficients as well as the empirical analysis of the level of concentration in the banking sector in CEE countries during the world economic crisis based on these techniques. Comparative analysis of the obtained results and practical implications are also the subject of our research.

Theory and methodology - Lorenz Curve and Gini Coefficient

The Lorenz curve is a graphical instrument through which it is possible to monitor the uniformity of the distribution of selected variables, and can therefore successfully be used for analyzes of concentration of various industrial sectors or markets (Marinković, 2007).

The Lorenz curve shows the distribution of the cumulative numerical sequence on its parts. It is constructed in the first quadrant of the coordinate system and consists of the points whose coordinates are determined by the members of cumulative sequences (Tipurić, Kolaković & Dumičić, 2002). Thus, using the Lorenz curve it is possible to show the link between the cumulative number of companies and their cumulative market share.

The x-axis shows the number of firms (F) grouped by size, from the smallest to the largest, while the y-axis shows the percentage of the offer (from 0% to 100%). The first step in constructing a graph with the Lorenz curve is defining the curve of 45°: the first point will have coordinates [0,0] and the last one [1,1]. As data is compared by size, x-axes are counted as the values of the empirical functions of distribution, according to the following formula:

$$F_x(x_i) = \frac{1}{N} \qquad (1)$$

i= 1, 2, ... N

The y-axes are the members of cumulative sequence of proportions of subsum and are calculated according to the following formula:

$$F_t(T_j) = \frac{\sum_{i=1}^{j} x_i}{T} \qquad (2)$$

$$T = \sum_{i=1}^{N} x_i$$

j=1, 2, ...N

The curve of 45°, is interpreted as a line of perfect equality, i.e. an even distribution of offers among companies. The equilibrium of distribution is observed on the basis of deviation of the Lorenz curve from the curve of 45 °, which shows the absolutely equal distribution of market share among all participants (Kostić, 2009). As the Lorenz curve moves away from the ideal distribution, the concentration of the sector is becoming more pronounced. An absolutely uneven distribution means that one company provides 100% offer in the sector.
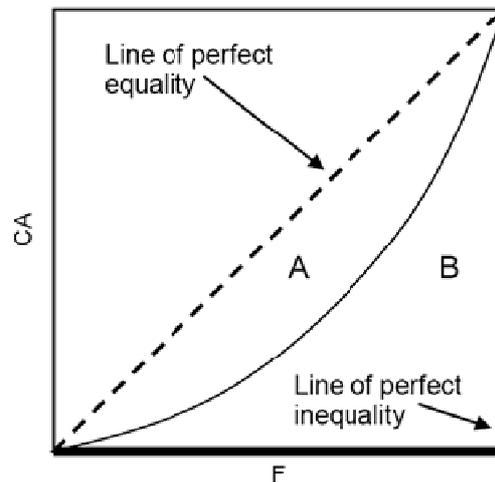

Figure 1. Lorenz curve

The main deficiency of the Lorenz curve is the unevenness of the distribution of market share between individual companies. In determining the degree of concentration, the number of companies will not play a significant role, so one company with 100% market share and ten companies with 10% of market share will be at 45 ° (Kostić, 2008). Also, the Lorenz curve does not show an easily comparable numeric data. In order to overcome the deficiency, this instrument of concentration is supplemented by the Gini coefficient (G).

The Gini coefficient is a parameter that follows the logic of the Lorenz curve. The value of the Gini coefficient is determined by the deviation of the Lorenz curve from the line of perfect equality. This measure of concentration is based on the assumption that companies' participation in the industry is split between the lowest and the highest. The Gini coefficient gives us a unique numeric indicator that describes the position of the Lorenz curve by determining the ratio between the area of the line of perfectly even distribution and the Lorenz curve (A) with the area below (or above) the line of perfectly even distribution, which by definition, mathematically, amounts to a half of the quadrant in which the Lorenz curve is drawn (Marinković, 2007). The coefficient can be calculated in two ways:

$$G = 1 - 2 \int_{0}^{1} L(x)dx \tag{3}$$

Where the interval $\int_{0}^{1} L(x)dx$ represents the area below the Lorenz curve. Another way for calulating the Gini coefficient is according to the following formula:

$$G = \frac{2}{\mu n^2} \sum_{i=1}^{n} (n - \frac{n+1}{2}) * q_i, \text{ i= 1,2, ... N} \tag{4}$$

where:
- n stands for the number of companies;
- μ stands for the average size of the company's sales on the given market

- r_i the ranking which the ith company occupies (companies are ranked according to the size of sale or their market share, ranging from the smallest to the biggest);
- q_i scope of sale of the ith company.

The value of the Gini coefficient can range from 0 to 1. If the Gini coefficient has a value of 0, all firms are of the same size and there is no concentration on the market. In this case, the Lorenz curve lies on the line of a perfectly equal distribution and the area between them cannot be mathematically expressed. When the obtained value approaches 1, there is a huge disproportion in the size of the offer among companies, i.e. one company dominates the industry.

The main disadvantage of this indicator is that it ignores the number of firms and solely observes the inequality in the offer between them. The industrial branch with two companies identical in size has the same value of the Gini coefficient as the industry with 100 firms of the same size, although the competitive structure of these two industries is completely different (Lipczynski & Wilson, 2001).

DATASOURCE AND FRAMEWORK METHODOLOGY

In this part of the paper, an empirical study of concentration levels in the banking sector was carried out in selected CEE countries in the period 2007-2012, using the Lorenz curve technique and the Gini coefficient. The territorial starting points for empirical research are the countries which the International Monetary Fund classified and defined as CEE countries.[1]. Our research includes the following countries of the CEE region: Serbia, Croatia, Bosnia and Herzegovina, Montenegro, Macedonia, Romania, Bulgaria and Albania. The analysis of the level of concentration in the banking sector is based on the following development criteria: Assets (total balance sheet) of the banking sector, loans granted to the non-financial sector and deposits of the non-financial sector (Dimić, 2018).

Data used in the research were collected on the websites of relevant financial institutions responsible for the control and supervision of banking sector operations as well as other available sources and publications of institutions responsible for the financial sector.

Table 2. Data sources for the banking sector

Country	Data sources for the banking sector
Serbia	National Bank of Serbia (Banking sector – analyses and reports, bank web sites, auditors' reports, annual reports)
Croatia	Croatian National Bank (Bulletin on banks)
Bosnia and Herzegovina	Banking Agency of the Federation B&H (Concise report of external auditors on banks' financial statements in FB&H)
Montenegro	Central Bank of Montenegro (Journal of Central Banking, Banks' Balance sheets and Profit and loss accounts)
Macedonia	National Bank of the Republic of Macedonia (Report on banking system of the Republic of North Macedonia)
Romania	National Bank of Romania (Monthly Bulletin of NBR)
Bulgaria	Central Bank of Bulgaria (Banks in Bulgaria)
Albania	Albanian Association of Banks (Banking System Monthly Bulletin)

Source: National banks of the analyzed countries

[1] According to the classification methodology used by the International Monetary Fund in its reports (*World Economic Outlook*), the following countries are listed in the group of Central and Eastern European countries (CEE region): Albania, Bosnia and Herzegovina, Bulgaria, Montenegro, Croatia, Lithuania, Latvia, Hungary, Macedonia, Poland, Romania, Serbia, Kosovo and Turkey.

Data processing was aimed at identifying the levels of concentration in the banking sector in the analyzed countries and their dispersion in the period 2007-2012, using the Lorenz curve and the Gini coefficient. The analysis was carried out in several steps:

- Calculation of concentration indicators in the analyzed countries using the three development indicators of the banking sector (assets, loans granted to the non-financial sector and deposits of the non-financial sector).

- Determining the average values of concentration indicators for each particular country in the analyzed period as well as the average weighted concentration indicators for the analyzed region in each individual year. Bearing in mind that different levels of realized balance sheet totals, loans granted to non-financial sector and non-financial sector deposits are reported in the group of analyzed countries in the region of Central and Eastern Europe, shares of individual countries are taken as the weights in the total amount of individual indicators of the analyzed region;

- Determining the statistical measure of variability using coefficient of variation (expressed as a ratio of standard deviation and mean value of concentration indicator, i.e. average weighted concentration indicator value). In this context, the following are analyzed: dynamic changes (variability) of the level of concentration by countries in the period 2007-2012, as well as the changes (variability) of the level of concentration between the countries analyzed for each year.

- Comparative analysis of the previously obtained results based on the use of CR4 and HHI and the results obtained using the Gini coefficient was made. Also, the correlation analysis of the obtained results was done.

- The survey also included establishing the intensity of the ratio of the individual concentration indicators and the GDP per capita. In this context, the Spearman's correlation coefficient

$$\rho = 1 - \frac{6 * \sum d^2}{n * (n^2 - 1)} \qquad (5)$$

where
ρ – stands for Spearman's correlation coefficient;
d – stands for the difference between the ranks x and y;
n – stands for the number of pairs of ranks of the x and y variables;

is used, which is suitable for data that can be ranked, especially for smaller series of data. Correlation coefficients range from -1 to 1, with the sign indicating the negative or positive correlation or the absence of correlation (0).

Research results – Lorenz curve and Gini coefficient

The Lorenz curve allows for a clear understanding of the distribution of the banking market (according to analyzed criteria) in CEE countries in the observed period. Based on our research, the following key points and characteristics of the banking sector can be stressed.

	Level of concentration (based on total assets)
Serbia	The first 50% of banks in the domicile market have a share of 13% of total banking sector assets, while the remaining 50% of banks account for 87% of the market. 90% of banks have a share of 67% of total assets
Croatia	50% of banks have a share of 4% of total assets. 90% of banks have a share of 45%, the remaining group of participants (10%) possesses about 55% of banking sector assets.

|	Level of concentration (based on total assets)
Bosnia and Herzegovina	1/3 of banks have a share of only 3.5%.
Montenegro	90% of the participants in the banking market have a share of 75% of total assets
Macedonia	50% of banks have a share of only 10% of total banking sector assets
Romania	About 30% of the market participants have a share of only 1%, while 90% of the bank has a slightly more than 50%.
Bulgaria	90% of banks have a share of 65% of total assets.
Albania	50% of the market participants participate in the market with 12%, while 95% have a share of 75%.
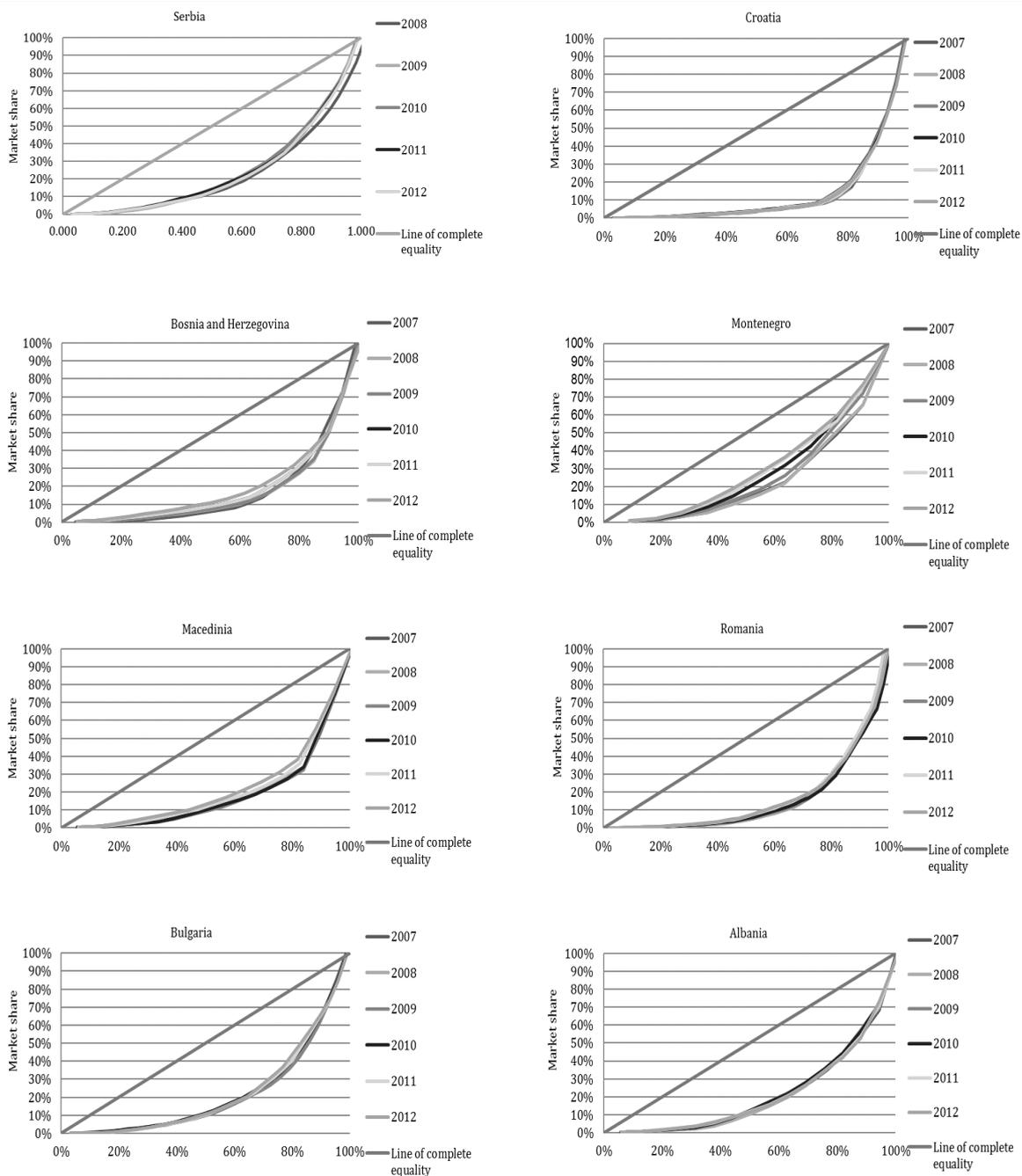
Figure 2. Lorenz curve for the banking market according to the criteria of total assets

Source: Based on authors' calculations

Regarding the criterion of the loans granted to the non-financial sector as well as collected deposits, the following results were obtained[2]:

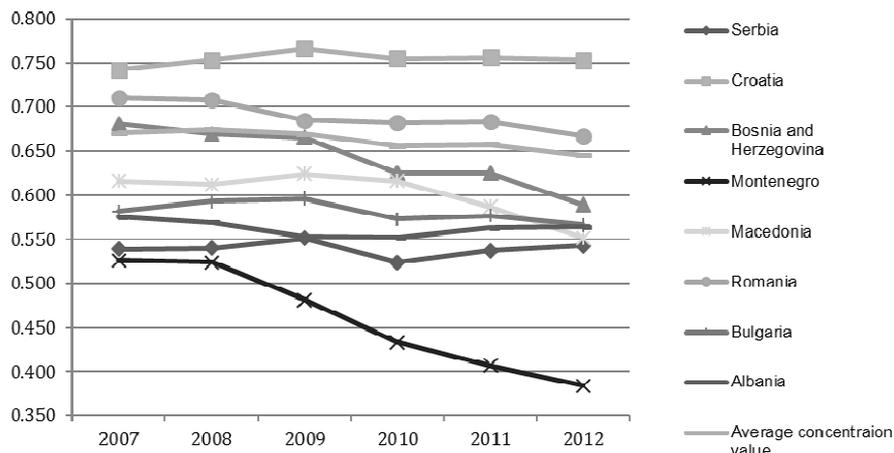|	**Level of concentration based on loans granted to non-financial sector**	**Level of concentration based on collected deposits from non-financial sector**
Croatia	2/3 of banks have a share of 6.6%, while 96% of the market participants have a share of 75%	50% of banks have a share of 4.5%.
Bosnia and Herzegovina	50% of banks have a share of 5%, while 90% of banks have a share of little more than 50%.	2/3 of banks have a share of 12%.
Montenegro	50% of banks participate with 20% in total loans granted to the nonfinancial sector.	2/3 of banks have a share of 25%.
Macedonia	95% of market players have a share of 75%.	2/3 of banks have a share of 17%.
Bulgaria	50% of banks participate with 8%.	2/3 of banks have a share of 20%.
Albania	2/3 of banks have a share of 25%	95% of banks have a share of 70%.

As far as Gini coefficient in the banking sector in the group of analyzed countries is concerned, it can be stated that the average values of the Gini coefficient show relatively similar values of the concentration according to the total loans granted to the nonfinancial sector (0.68), the deposits collected from the nonfinancial sector (0.67) and the total balance sheet (0.66). Generally, average values are in the medium to high concentration zone.

Values of the Gini coefficient, according to the total assets of the banking sector, show that Serbia, Bulgaria, Albania and partially Montenegro have values of 0.5. Other countries in the analyzed region recorded values ranging from 0.6 to 0.8, with the highest degree of market share inequality in Croatia in the observed period.

According to the criterion of loans granted to the nonfinancial sector, the level of concentration measured by the Gini coefficient gives similar results as in the previous case. Thus, in the four of the six analyzed countries in the region there is a high value of the Gini coefficient ranging from 0.6 to 0.8.

Obtained values of the Gini coefficient for deposits collected from the non-financial sector show that Croatia and Bosnia and Herzegovina, with values above 0.7, may be ranked as markets with a high degree of inequality of market share distribution.
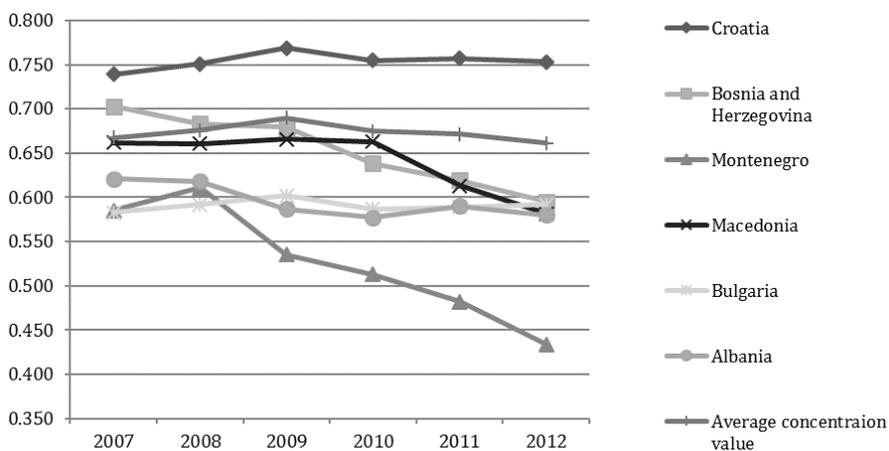
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[2] Serbia and Romania are excluded from the average values according to the criterion of loans granted to the non-financial sector and collected deposits of the non-financial sector due to the lack of data.

Based on total assets of banking sector
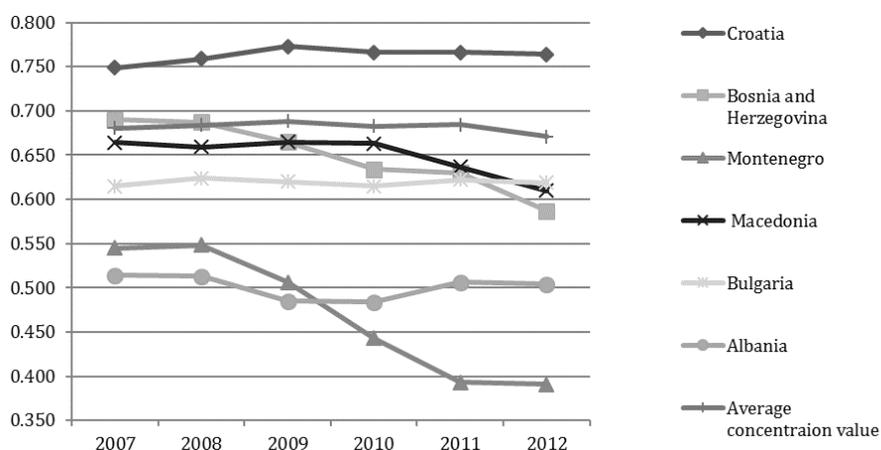
Based on loans granted to non-financial sector

Based on collected deposits from non-financial sector

Figure 3. Gini coefficient in banking sector
Source: Based on authors' calculations

Our previous research, in which the indicators CR4 and HHI were calculated, showed that the degree of concentration and inequality in the banking sector in the region stagnates in the observed period. On the basis of the calculated average values of the CR4 indicator, the banking

market, measured by all three criteria of development, belongs to a group of highly concentrated markets (above the 50% limit value).

Contrary to the share indices of the four largest banks', the average values of HHI in the banking sector in the region, according to all three analyzed development criteria, show the values which indicate a mid-concentrated market (from 1,000 to 1,800 points).

The following table presents data that relate to the variability (expressed by coefficient of variation) of the Gini indicator on the banking market according to countries in the period 2007-2012 as well as data related to the variability of the Gini indicator among countries per years. The obtained results show that values of coefficients of variation among countries, according to all three criteria of development, are greater than the variation that occurred in individual countries.

Coefficients of variation of the Gini indicator show that the biggest changes occurred on the banking market of Montenegro (loans granted to the non-financial sector - 15.3%), while on the other hand, the least oscillation was present on the banking market in Croatia. Regarding the coefficients of variation between countries, the maximum values (all three indicators of the banking sector's development) were recorded in 2012.

Table 3. Coefficients of variation of the Gini coefficient (in %) in banking sector

Coefficient of variation in countries in the period 2007-2012				Coefficients of variation among the countries per years		
Country	Balance sheet total	Granted loans	Collected deposits	Year	Balance sheet total	Granted loans	Collected deposits
Serbia	1.6	n.a.	n.a.	2007	11.3	10.7	10.6
Croatia	1.0	1.1	1.3	2008	11.1	11.0	10.7
Bosnia and Herzegovina	5.5	6.1	6.4	2009	11.4	12.9	12.0
Montenegro	13.1	15.3	12.4	2010	12.8	13.8	12.5
Macedonia	4.5	3.4	5.5	2011	12.8	14.3	13.0
Romania	2.4	n.a.	n.a.	2012	13.1	14.8	13.7
Bulgaria	2.0	0.6	1.1				
Albania	1.6	2.7	3.2				

Source: Authors' calculations

The following table summarizes the ranking of countries according to analyzed indicators of concentration in the banking sector based on the criterion of the balance sheet total in 2007 and 2012 (the rank 1 represents the highest level of concentration, while the rank 8 represents the lowest level of concentration). According to the largest number of analyzed indicators of concentration, the banking market in Serbia was the least concentrated market in the group of analyzed countries in the observed period. Also, an overview of country rankings changes according to the concentration indicators in the banking sector (regarding the criterion of balance sheet total) was prepared. The results obtained show that there were no significant changes in the ranking of countries according to certain concentration indicators in the analyzed period. Thus, the ranking of countries according to the indicator CR4 remained unchanged in 2012 compared to 2007 in all analyzed countries. The highest oscillations were recorded in the ranking of countries according to the HH index (in five out of eight countries). Analyzed by countries, the banking market in Romania and Serbia did not record changes in country ranking according to none of the analyzed concentration indicators in the observed period.

Table 4. Country ranking and change in ranking
(according to concentration indicators based on total assets)

	2007			2012			Change in country ranking		
	CR4	HHI	G	CR4	HHI	G	CR4	HHI	G
Serbia	8	8	7	8	8	7	=	=	=
Croatia	3	5	1	3	4	1	=	-1	=
Bosnia and Herzegovina	2	4	3	2	1	3	=	-3	=
Montenegro	5	1	8	5	5	8	=	+4	=
Macedonia	1	2	4	1	3	6	=	+1	+2
Romania	6	6	2	6	6	2	=	=	=
Bulgaria	7	7	5	7	7	4	=	=	-1
Albania	4	3	6	4	2	5	=	-1	-1

Source: Authors' calculation

Our research has shown that there are differences in the degree of correlation among the analyzed concentration indicators. Because of that, in terms of statistics, it is difficult to talk about the capacity of only one indicator, if analyzed independently, to show the real nature of competition in the banking sector in the analyzed countries and to provide quality estimates of possible future movements. A statistically significant positive correlation between the indicators CR4 and HHI (0.911) was found with the significance threshold of 0.01, as well as the relative weak correlation of the Gini coefficient with the indicators of CR4 and HHI. In this context, in order to have a more accurate insight into the concentration level, it is necessary to include a greater number of concentration indicators as well as their integral understanding.

Table 5. Pearson correlation coefficient between concentration indicators
(according to the criterion of total assets)

		CR4	HHI	G
CR4	Pearson Correlation	1	.911**	.209
	Sig. (2-tailed)		.000	.154
	N	48	48	48
HHI	Pearson Correlation	.911**	1	-.023
	Sig. (2-tailed)	.000		.876
	N	48	48	48
G	Pearson Correlation	.209	-.023	1
	Sig. (2-tailed)	.154	.876	
	N	48	48	48

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Authors' calculation

Additionally, a qualitative assessment of common and specific elements characteristic for the sector (nature of the market and the relationship between competitors on it) is needed (Lipczynski & Wilson, 2001). These elements have greatly influenced or will affect the development of banking in the analyzed countries. Starting from the research in which Deidda & Fattouch (2005) analyzed the relationship between economic growth and bank concentration, concluding that in relatively underdeveloped countries the concentration in the banking sector was negatively correlated with economic growth, we tried to test the strength of the relation between the concentration level (expressed by CR4, HHI and G concentration indicators) and the gross domestic product per capita (GDP per capita) indicator, using the correlation of ranking, on the example of analyzed countries in 2007 and 2012.

Table 6. Spearman's correlation coefficient between the concentration indicators (according to the criterium of total assets) and gross domestic product per capita

2007			2012		
		GDP per capita			GDP per capita
CR4	Correlation Coefficient	-.310	**CR4**	Correlation Coefficient	-.333
	Sig. (2-tailed)	.456		Sig. (2-tailed)	.420
	N	8		N	8
HHI	Correlation Coefficient	-.286	**HHI**	Correlation Coefficient	-.571
	Sig. (2-tailed)	.493		Sig. (2-tailed)	.139
	N	8		N	8
G	Correlation Coefficient	.381	**G**	Correlation Coefficient	.452
	Sig. (2-tailed)	.352		Sig. (2-tailed)	.260
	N	8		N	8

Source: Authors' calculation

Obtained Spearman's coefficient values argue that the level of concentration in the banking sector is poorly correlated with the level of economic development, since in all observed parameters the correlation value is moving to the zone of very low values. This, on the one hand, points to the fact that the analyzed countries at relatively similar levels of development had significantly different levels of concentration, but also the fact that some countries, although at different levels of development, had similar levels of concentration of the banking sector. In the first case, a group of countries that have almost equal GDP per capita (Serbia, Bosnia and Herzegovina and Macedonia) had large differences in the level of concentration. On the other hand, although Croatia and Albania vary significantly according to the level of economic development (three times higher GDP per capita in Croatia than in Albania in 2012), they have similar levels of concentration in the banking sector (according to total assets).

Having in mind the analyzed development criteria (balance sheet, granted loans and collected deposits), it can be stated that the banking sector in the region lags behind the banking sector in the EU countries, primarily due to the low and underdeveloped market, political, economic and credit risks, but also insufficient innovativeness and high poverty rates. Most of the reform reflected in the privatization of state-owned banks and the opening of the domestic financial market for foreign investments. At the beginning of the restructuring process, the domination of state-owned banks was noted. Several years after, the market share of foreign investors was higher. Regarding the number of participants in the banking market, in the number of banks in the region was stagnant. The lack of interest of foreign banking groups can be explained by the fact that fewer banks have been attractive for takeover, that the banking market in the region is oversaturated, that the banking profit margins have fallen (due to which many investors left the market in the region), but also the negative effects of the world economic crisis, which have led to the increase in the venture investments and the fall in liquid assets available to foreign investors.

CONCLUSION

The results obtained by empirical research in analyzed countries in the period 2007-2012 indicated high average level of concentration in the banking sector measured by Gini coefficient.

Regarding the hypothesis 1, the results of the correlation analysis of the CR4, HHI and the Gini coefficient indicated significant differences in the degree of correlation between individual concentration indicators. From the findings of the conducted research we can conclude that relatively different conclusions can be drawn about the level of concentration on the banking market in the analyzed countries in the region while using different techniques and indicators of concentration. If analyzed individually, the indicators have relatively low capacity to present the real nature of competition in the banking sector in the observed countries as well as to provide a

good estimation of possible future trends. Therefore, simultaneous analysis of several concentration indicators is needed.

Regarding the hypothesis 2, our research indicated that the degree of concentration in the banking sector is poorly correlated with the level of economic development.

In order to obtain clearer images of market concentration in the financial sector, recommendation to decision-makers in referent institutions and regulatory bodies is to include a greater number of concentration indicators in their reporting on the level of concentration in the banking sector, which can contribute to a more precise definition of adequate policies and legal regulations in this area.

In addition to the quantitative analysis of the level of concentration, it is also necessary to qualitatively assess the common as well as the specific elements of the banking sector in the countries of the region. In this context, it is necessary to take into account the specificities of individual countries (institutional barriers, geographic barriers to entry, macroeconomic indicators and historical aspects) as well as the characteristics of the banking sector.

The referent regulatory bodies are expected to establish appropriate mechanisms and instruments of economic and financial policy and controlling as well as to define legal regulation in this area that will encourage the enlargement of the market scene in the analyzed sectors (which should contribute to further business efficiency), but also to prevent the creation of undesirable and over-concentrated markets and market structures. In this context, the approach and methodology used in this research can contribute to a better and more accurate understanding of all relevant issues of concentration of the banking sector as well as a good basis for making appropriate decisions in this area.

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