



MEASURES OF CONCENTRATION LEVEL IN THE BANKING SECTOR: EMPIRICAL EVIDENCE FROM SERBIA, CROATIA AND MONTENEGRO¹

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Abstract:

In the last few years there were significant changes in the financial sector on the global level. The aim of this paper is to analyze banking sectors among Serbia, Montenegro and Croatia and make comparative analysis. In these countries the biggest part of financial sector is the banking sector. The covered period of the analysis is 2017-2021 and selected ratios of concentration were calculated to define market structures in these countries. Due to mergers and acquisitions in the last few years the number of the banks decreased significantly. The presented results regarding static and dynamic analysis of concentration indicate that Croatia and Montenegro banking sectors are more concentrated than Serbia banking sector. The significant impact on market structure is the decreasing number of the banks. This is an interesting finding which should be further researched.

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INTRODUCTION

The capital markets are still not developed in transition economies as they are in the developed economies. Banks play a vital role in the economy of each country and their importance is emphasized in developing countries, where the financial system is characterized as a bank-based system (Fotova Čiković & Cvetkoska, 2022). The banking industries of transition economies are the main channel through which financial resources are distributed across the region. (Guidi, 2021). Serbian banking sector has witnessed a significant turnaround in competitive conditions since 2002. Transition era was characterized by changes in bank market structure such as financial integration, privatization and deregulation, mergers and acquisitions, financial reforms, and foreign bank penetration.

¹ This paper is the result of a short presentation and latter discussion related to the study on concentration level in the banking sectors, which took place at the International Scientific Conference FINIZ held in Belgrade at the end of 2022.



In the last 15 years the transfer of European countries' capital to the region's banking sector was accelerated. One of the most significant steps in the transition process has been the introduction of market competition, including the demonopolization of highly concentrated economies and expansion of the private sector in the economics (Đuranović & Filipović, 2021).

The number of the banks decreased and especially banks with domestic capital. Due to this, there have been changes in the structure of the region's banking sectors, which affect market concentration and the level of competitiveness. The great number of factors can be included in the analysis of the market structure, but most important factors are the number of the competitors operating in the market and dispersion of the market share between competitors. Sometimes, when sector includes a great number of competitors it can be difficult to cover them all in the analysis. As long as there is no great number of the banks that operate in the regional banking sectors, it is easy to include all market participants in the following analysis. In the presence of scale and scope economies, rising bank concentration may reduce borrowing costs. However, if accompanied by rising market power, greater concentration may, under some conditions, lead to higher spreads and suboptimal credit volumes (Elekdag, Malik & Mitra, 2020).

Transition of banking and financial systems to a market economy started during the 1990s in Croatia and at the beginning of this century in Serbia and Montenegro. In all analyzed countries there were large state owned banks and small private owned banks. The transformation process was mostly conducted by the sale of banks to foreign investors or by foreign banks green field investments. This process brought a set of advantages in domestic banking systems. One of the most important advantages was improvement of competition between banks in these countries.

The aim of this paper is to analyze banking sectors and make comparative analysis among Serbia, Montenegro, and Croatia concentration levels in the banking sector. Also, analyzing the level of concentration there is a possibility to come to some conclusions on the level of competitiveness in these banking sectors.

The rest of the paper is organized as follows: Section 2 summarizes the related literature; Section 3 explains the methodology and measurement of variables; Section 4 discusses the empirical results and section 5 concludes the paper.

LITERATURE REVIEW

In the last few decades market concentration along with competition policy is the subject of many research studies. Most of the empirical studies that analyze banking sector include measuring the level of concentration, market power efficiency of the banks and the relationship between them and profitability. There are numerous papers dealing with the issue of measuring concentration and competition in the banking sector, but these aspects have been widely investigated in the context of developed countries (see Akins *et al.*, 2016; Jirawan *et al.*, 2020; Clark *et al.*, 2018; Fiordelisi & Mare, 2014; Leroy & Lucotte, 2017; Owen *et al.*, 2011; Jayakumar *et al.*, 2018; Khan *et al.*, 2016), while only a few studies have focused on Serbia, Montenegro and Croatia and aspects of concentration and competition (Khan, 2022; Guidi, 2021; Anđelinović *et al.*, 2022; Grubišić *et al.*, 2021; Kozak *et al.*, 2021; Bukvić, 2019).

The concentration indices represent an essential element of a competitiveness analysis of a particular sector and the level of competitiveness determines the market structure as well as the market power of a certain sector. Khan *et al.* (2016) analyzed behavior of different competition measures for the ASEAN banking industry over the period of 1999–2014. They found that different bank concentration ratios



based on assets, deposits and loans increased during the period mentioned. All these measures indicate an overall increase in bank concentration (decrease in competition level) over this period. Moreover, the increase in the Lerner Index suggests competitive conditions worsening (increase in market power).

The widespread trend of the consolidation of banks and an increased concentration indicates a changed market structure of the economy (Anđelinović, Milec & Dumičić, 2022). Bubanić (2021) highlighted that the basic measures for assessing the concentration are the concentration ratio (CR_k) and the Herfindahl-Hirschman index (HHI). Most of the central banks in their official reports include these measures of concentration. Considering empirical research, we can conclude that authors use different balance positions such as assets, loans, deposits, and interest revenue (Bikker & Haaf, 2002; Bruhn *et al.*, 2013).

In order to analyze SEE banking sectors, Guidi (2021) used CR₃, Lerner index and Herfindahl-Hirschman index, covering the period from 2003 to 2012. In these years the degree of concentration became lower from year to year and banking sectors were characterized by monopolistic competition. Also, he found a reduction of non-performing loans as well as a reduction in the probability of insolvency of SEE banks. He also analyzed the relationship between market concentration and non-performing loans ratios as a factor of financial stability. The reduction of the non-performing loans ratios is a result of greater market concentration and, as he concluded, better financial stability of the banks analyzed.

Kozak & Wierzbowska (2021) researched the impact of banking market structure on bank profit efficiency in Southern, Eastern and Central Europe countries between 2005 and 2019. Their results indicate that, in the entire region, both in the EU and non-EU countries, the increase in concentration positively affects the banks' profit efficiency.

Barjaktarović, Filipović & Dimić (2013) analyzed the concentration of the banking sector of 9 Central and Eastern European countries in the period from 2007 to 2012 for the banking sector data such as assets, approved loans, and collected deposits. Their results suggest moderately to highly concentrated market according to CR₅ and no market concentration to moderate concentration according to HHI.

Galetić & Obradović (2018) measured concentration of the banking market in the Republic of Croatia in 2017 using a great number of concentration indexes such as: the Herfindahl-Hirschman's index, the Hall-Tideman's, the Rosenbluth's index, the extensive industrial concentration index, the Hannah-Kay's index, the Index U, the Hause's index and the entropy measure. They concluded that monopoly competition exists on the market but also oligopoly operates in the market because eight banks control almost 90% of the market.

Đuranović & Filipović (2021) analyzed the impact of market concentration on competitiveness of the banking sector in Serbia using total assets, total collected deposits and total approved loans from 2018 to the third quarter of 2020. They concluded that competition among banks in Serbia is without threats of monopoly and although there were plenty of participants in 2020, the market structure is not oligopolistic - it has more of the so-called loose oligopoly.

Beck, De Jonghe & Mulier (2022) took sectoral concentration as starting point and aimed to document how it affected bank risk and systemic risk. They developed a new methodology to estimate the sectoral concentration of 1,716 banks across 34 countries over the period from 2002 to 2012. They constructed proxies for three aspects of banks' sectoral concentration - banks' sectoral specialization, banks' sectoral differentiation and banks' financial sector exposure, using a common framework that is widely applicable. They found out that specialization is negatively associated with individual bank risk and systemic bank risk while differentiation and financial sector exposure is positively associated with systemic bank risk.



Khattak *et al.* (2022) analyzed the importance of banks power and the impact of market concentration on bank's deposit rate in the sample of 120 banks for the period from 2007 to 2018. They concluded that power appears to be reducing the deposit rates and market concentration shows no significant impact on banks' deposit rate. Also, in the case of the conventional banking, pricing power negatively impacts deposit rates while in the Islamic banking, deposit rates are severely influenced by market concentration.

Grubišić, Kamenković & Kaličanin (2021) made comparative analysis of the banking sector concentration in Serbia and Montenegro covering the period from 2015 to 2019. It is concluded that compared to Serbia, the banking sector of Montenegro is characterized by a smaller number of banks, a higher level of market concentration, and weaker competition.

METHODOLOGY

The concentration ratio is often used as a beginning step when analyzing the level of concentration because it is very simple to calculate. This indicator is obtained as the sum of market shares of the banks which are previously grouped from the biggest to the smallest one, i.e. from the bank with the largest share to the bank with the smallest share in the market. Summing only the market shares of the k largest banks in the market, it takes the form:

$$CR_k = \sum_{i=1}^k s_i \quad (1)$$

putting equal emphasis on the k leading banks but neglecting the many small banks in the market. There is no rule for the determination of the value of k , so that the number of banks included in the concentration index is rather an arbitrary decision (Bikker & Haaf, 2002). In equation 1 s_i stands for the market share of the i bank and k stands for the number of banks we use when calculating the ratio.

The Herfindahl–Hirschman Index is one of the most commonly used indicators to detect anticompetitive behavior in industries. The index is defined as the sum of the squares of the shares of the individual exposures, and it is considered as the simplest approach (Gagnon *et al.*, 2018). In fact, an increase in the index value is usually interpreted as an indicator of actions which may lessen competition or even create a monopoly (Matsumoto, Merlone & Szidarovszky, 2012). If we consider a market where n companies are operating, and the market share of the i -th company is s_i , the HHI is defined as the sum of the squares of all market shares (Naldi & Flamini, 2014):

$$HHI = \sum_{i=1}^n s_i^2 \quad (2)$$

Herfindahl-Hirshman index taking values up to 100 marks competitive banking industry; up to 1,500 – unconcentrated industry; between 1,500 and 2,500 indicates moderate concentration, while HHI above 2,500 indicates highly concentrated industry (Vujanović & Fabris, 2021). In this paper the balance sheet position total assets was used for calculating concentration ratio and Hirshman-Herfindahl index.

In addition to concentration ratios, Lorenz curves were used to graphically interpret the dispersion of market shares in selected banking sectors. In practice, it is very common to synthesize the information of the Lorenz curve in a single numerical value that quantifies income inequality. Different characteristics, functionals and values of the Lorenz curve are used to construct those inequality indices (Baillio, Carcamo & Morra-Corral, 2022).



This curve is widely used in economic studies and was introduced to represent the concentration of wealth (Bongiorno & Goia 2019). All above mentioned indexes and Lorenz curves are authors' own calculations based on data from official reports of the National bank of Serbia, the Central bank of Montenegro and the Croatian National bank.

RESULTS AND DISCUSSION

In the analyzed period from 2017 to 2021, there have been significant changes in the banking sector of the observed countries. From year to year, there have been certain decrease in the number of the banks which has been shown in Figure 1. In the banking sector of the Republic of Serbia in 2017, 29 banks operated in the market and in 2021 there were 23 banks, i.e.:

- ♦ At the end of December 2017, the banking sector of Serbia consisted of 29 banks with a license to operate, i.e. one bank less than at the end of September 2017. Jubanka Belgrade (former Alpha bank) was merged to AIK Bank Belgrade.
- ♦ At the end of December 2018, the banking sector of Serbia consisted of 27 banks, which is one bank less than at the end of September 2018. The decrease in the number of banks, business units and the number of employees is primarily the result of the merger of Piraeus bank Belgrade to Direktna bank Kragujevac in October 2018. The Executive Board of the National Bank of Serbia made a decision about revocation the license for Jugobanka Kosovska Mitrovica.
- ♦ At the end of December 2019, the banking sector of Serbia consisted of 26 banks, which is one bank less than at the end of December 2018. OTP bank at the end of April 2019 became the 100% owner of Vojvođanska bank Novi Sad and changed its name to Vojvođanska bank Novi Sad.
- ♦ At the end of June 2021, MTS bank was merged to Banka Poštanska Štedionica Belgrade. At the end of December 2021 Direktna bank and Eurobank Belgrade merged and continued to operate as Eurobank Direktna, so the banking sector of Serbia consisted of 24 banks at the end of 2021.

The banking sector of Montenegro consisted of 15 banks in 2017 and the number of the banks also decreased in the observed period, i.e.:

- ♦ In 2019 Central bank of Montenegro has declared Invest bank Montenegro Podgorica and Atlas bank Podgorica bankrupt and has started insolvency proceedings.
- ♦ In December 2020 Podgorička bank Podgorica was merged to Crnogorska komercijalna bank Podgorica so the banking sector of Montenegro consisted of 12 banks at the end of 2020.
- ♦ At the end of 2021 11 banks operated in the market due to the fact that in November 2021 Komercijalna bank Podgorica was merged to NLB bank Podgorica.

The banking sector of Croatia consisted of 29 banks in 2017 and the number of the banks decreased to 23 in 2021, i.e.:

- ♦ In 2018 there have been four mergers in Croatia banking sector: Jadranska bank was merged to Hrvatska savings bank, Splitska bank was merged to OTP bank Hrvatska, Veneto bank was merged to Privredna bank Zagreb and Prva housing savings bank was merged to Zagrebačka bank. At the end of 2018, 25 banks operated in the market.
- ♦ In 2019 Jadranska bank and HPB savings bank were merged to Hrvatska savings bank.

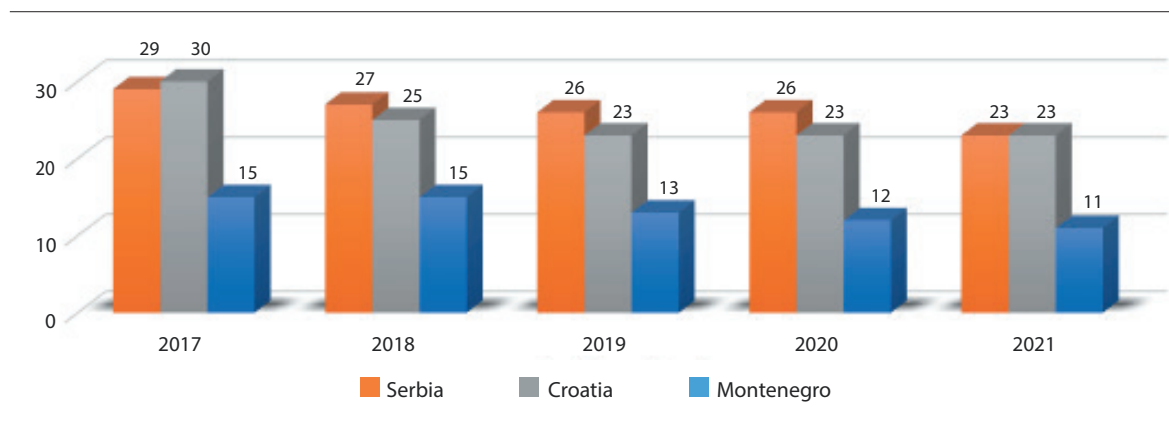
**Figure 1.** Number of the banks, 2017-2021

Figure 2 shows dynamic analysis of total assets to gross domestic product in the analyzed period for all three countries using the data from Central banks reports. As it can be seen Croatia had the highest ratio and was above 100% in all years of the observed period. Serbia had the lowest TA to GDP ratio and its value was lowest in 2017 – 77% and highest in 2020 – 87%. The share of total assets in gross domestic product of Croatia was 95% on average in 2017-2019 and then rose to 109%. As shown in Figure 2, in case of all three countries this ratio rose from 2019.

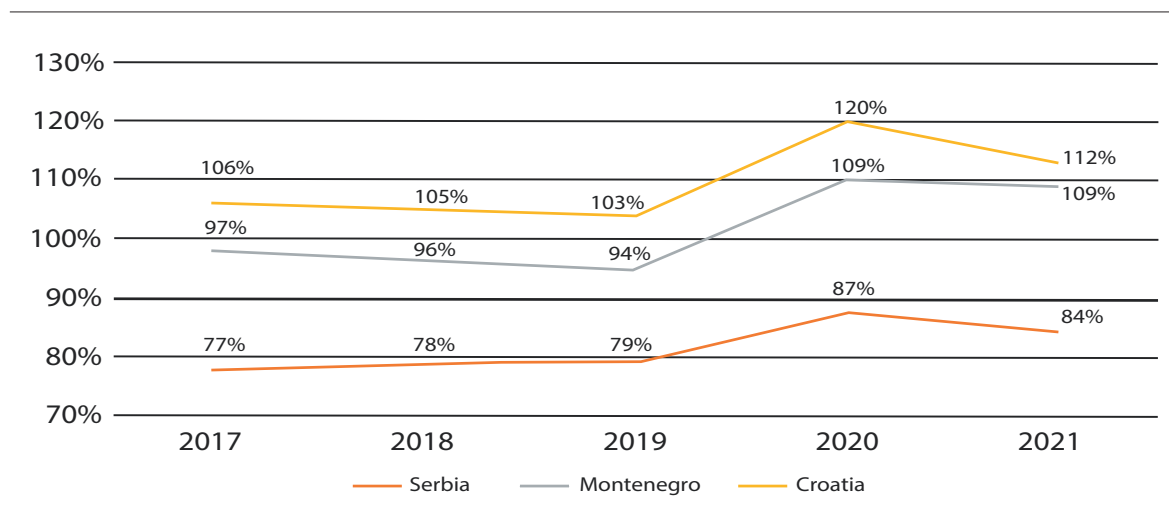
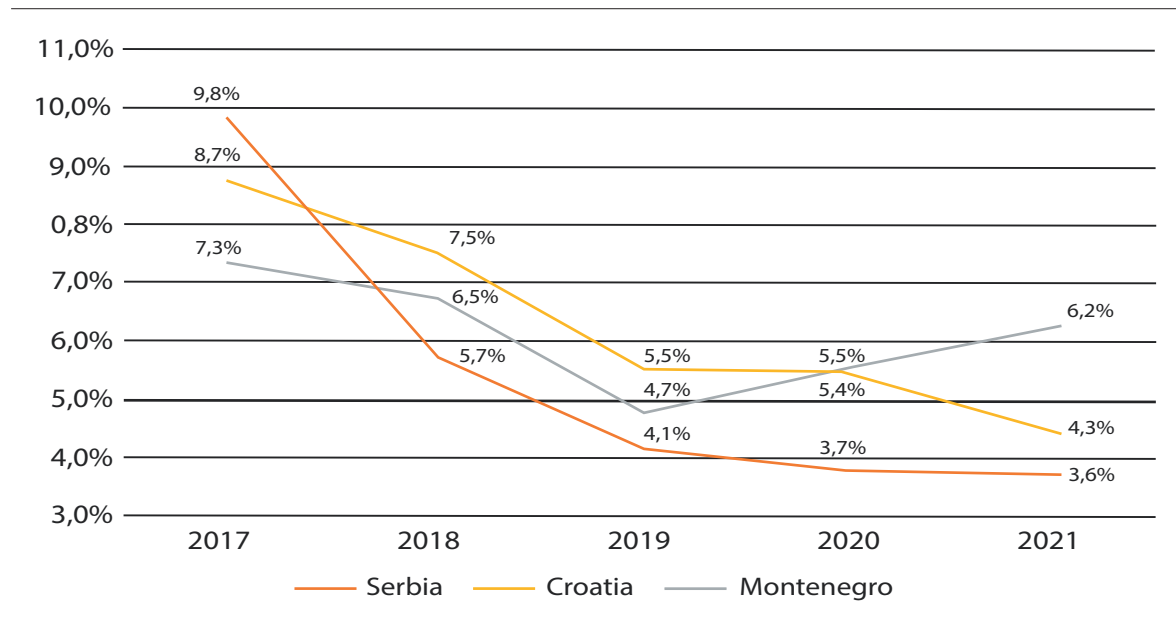
Figure 2. Total assets to GDP ratio, 2017-2021



Figure 3. NPL, 2017-2021



Since 2008 non-performing loans were in focus of economic topics related to banking. Figure 3 shows the percentage of non-performing loans in total loans in Serbia, Montenegro and Croatia covering the period from 2017 to 2021. Following the trend lines for Serbia and Croatia it can be concluded that there was a drop in this ratio from year to year. In case of Montenegro there has been a decline from 7,3% in 2017 to 4,7% in 2019 and after that this ratio rose to 6,2%. In case of Serbia and Croatia NPL had the lowest values in 2021 – 3,6% and 4,3%, respectively.

Table 1. Return on assets and return on equity, 2017-2021

Country/Year		2017	2018	2019	2020	2021
SRB	R	2,1%	2,2%	1,8%	1,1%	1,2%
CRO	O	0,6%	1,2%	1,4%	0,6%	1,2%
MON	A	0,9%	0,6%	1,1%	0,6%	0,7%
SRB	R	10,5%	11,3%	9,8%	6,5%	7,8%
CRO	O	5,9%	8,4%	9,8%	4,4%	8,8%
MON	E	7,0%	4,9%	8,7%	4,1%	5,3%

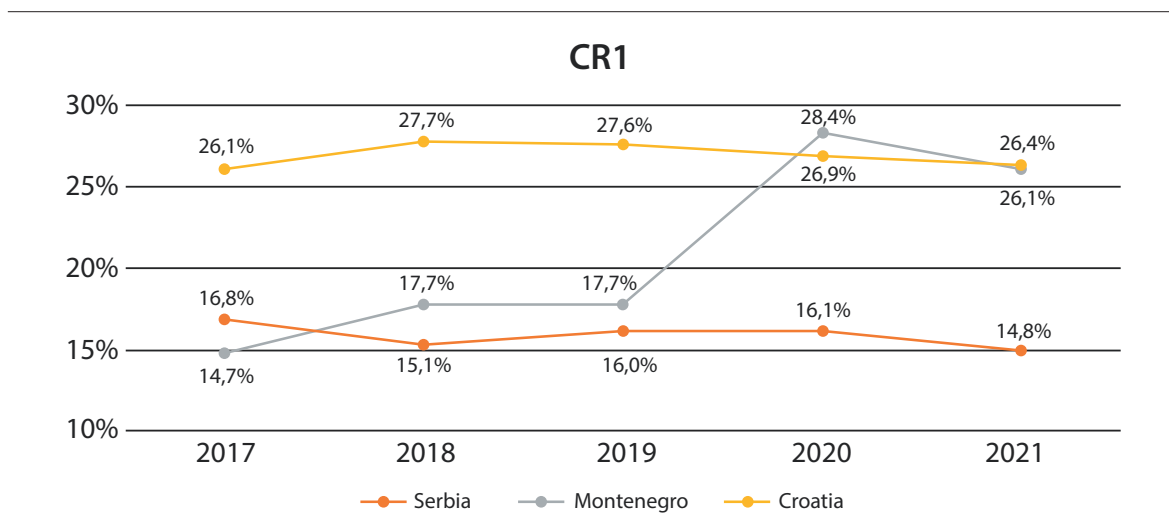
Table 1 shows the values of return on assets and return on equity – profitability ratios in the analyzed period. Compared to Montenegro and Croatia, Serbia had the highest values of return assets in the range 1,1 to 2,2% and in 2021 Serbia and Croatia had the same value – 1,2%. Montenegro banking sector had return on assets below 1% except for 2019 – 1,1%. Analyzing the values of return on equity it can be seen that Serbia had higher values than Croatia and Montenegro in 2017-2021. The highest ROE was in 2018 – 11,3% and the lowest was in 2020 – 6,5%. Considering Croatia banking sector, ROE was in the range 4,4 to 9,8% and in the last year of the observed period – 8,8%. On average, Montenegro had lower ROE in these years – 4,1 to 8,7%. The lowest ROE was in 2020 and the highest in 2019.



Figure 4 shows the dynamic analysis of the market share of the leading banks, i.e., the concentration ratio of the leading banks in the period from 2017 to 2021 measured by total balance sheet assets for Serbia, Montenegro, and Croatia. As can be seen from the graph, Croatia has the highest value of CR1 ratio, which was in the range 26.1 to 28.4%. The bank with the highest market share measured by total balance sheet assets did not change - Zagrebačka bank. In the Serbia banking sector, the CR1 ratio was in the range 14.8 to 16.8%.

In the banking sector of Republic of Serbia, the leader on the market is Banca Intesa. As seen in figure, the lowest share is 14.8% in 2021. In the period from 2017 to 2019 there were some minor changes in CR1 considering Montenegro banking sector, but after 2019 CR rose significantly to 28.4% in 2020. This increase in value is the result of the merger of Podgorička bank AD Podgorica and Crnogorska komercijalna bank AD Podgorica. In that way, Crnogorska komercijalna bank increased its share in the banking sector of Montenegro. In the Croatia banking sector, market share of the leader was in the range 26.1 to 27.7% so there have not been significant deviations in the value of this ratio.

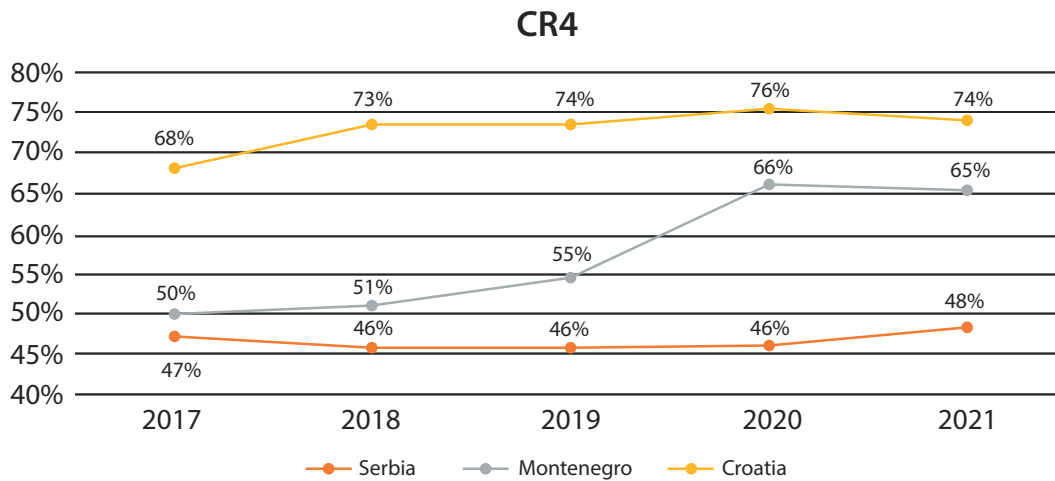
Figure 4. Concentration ratios of the leading banks, 2017-2021



The dynamic analysis of CR4 ratio is shown in the Figure 5 for Croatia, Montenegro and the Republic of Serbia and this ratio is measured by balance sheet - total assets. It can be seen that Serbia had the lowest value of CR4 and Croatia the highest. CR4 for Serbia banking sector was about 47% in the observed period and CR4 for Croatia banking sector was 72% on average. There was significant deviation in the value of CR4 ratio for Montenegro banking sector, which rose in the period from 2019 to 2020, from 55% to 66%, respectively. This is the result of the aforementioned merger of Podgorička bank and Crnogorska komercijalna bank.

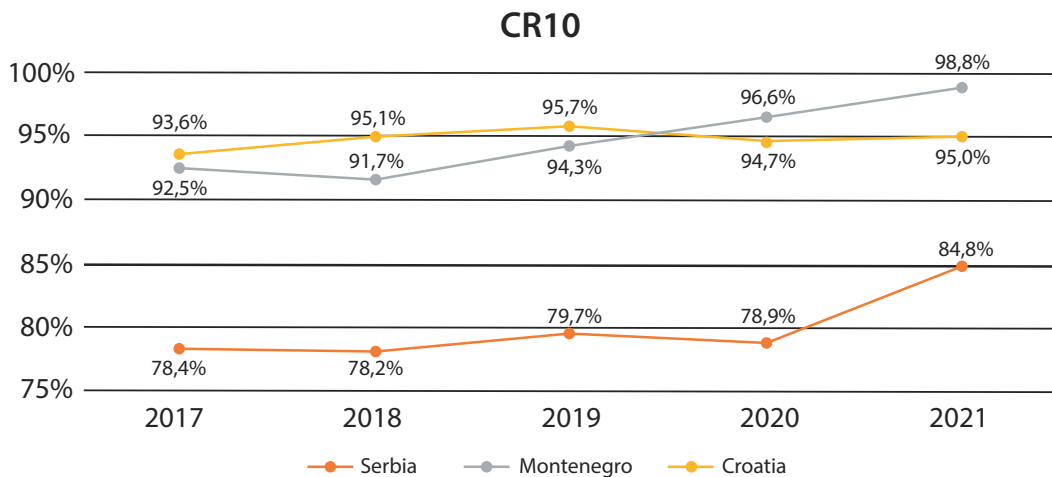


Figure 5. Concentration ratios of the four leading banks, 2017-2021



The value of the concentration ratio of the first four banks in the banking sector of Serbia did not change significantly in the observed period and was in the range 46 to 48%. If the value of the cumulative market share of the first four banks is higher than 40%, it can be concluded that such a market is characterized by an oligopoly market structure (Lončar & Rajić, 2012). Taking this into consideration it can be concluded that these market sectors are characterized as oligopoly market structures.

Figure 6. Concentration ratios of the ten leading banks, 2017-2021



Considering the values of the CR10 in Figure 6 it can be concluded that Montenegro and Croatia have higher levels of this concentration compared to Serbia. The highest level is in 2021 for the Montenegro banking sector – 98,8%. This is expected considering that only eleven banks operate in the market. CR10 for the Croatia banking sector was from 93,6 to 95,7% for the period 2017 to 2021. As long as 23 banks operate in 2021 in Croatia banking sector it is obvious that there is a great number of banks which have low market share – 15 banks have market share less than 1%. In the banking sector of Serbia there has been a significant increase from 78,9% in 2020 to 84,8% in 2021. As long as 23 banks operated in 2021, 13 banks share 15% of the market and 8 of them have market share less than 1%.

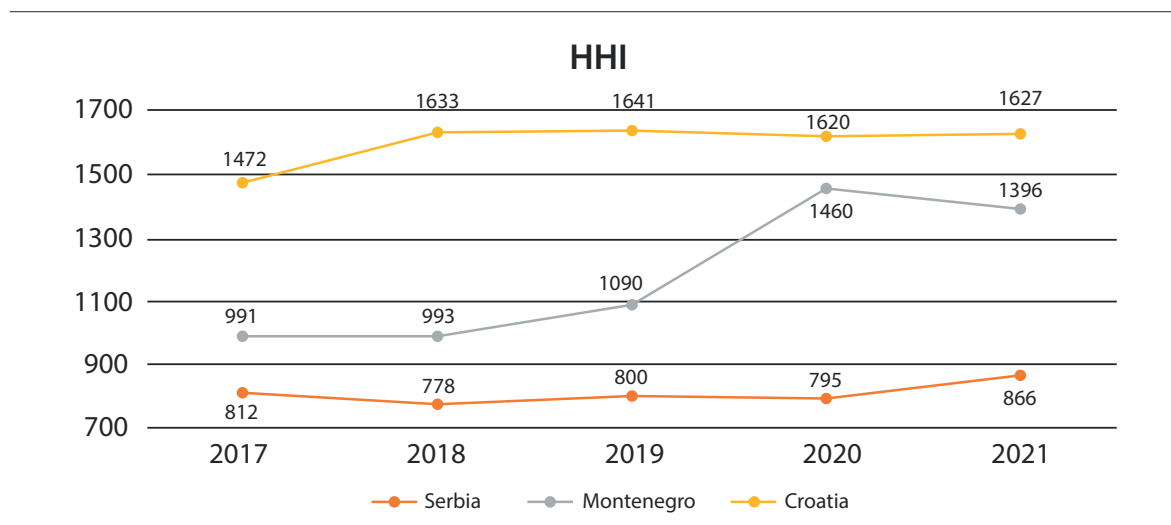
**Figure 7.** Comparative analysis of Herfindahl Hirschman index

Figure 7 shows the comparative analysis of Herfindahl Hirschman index for Serbia, Montenegro and Croatia covering the period 2017 to 2021. In the banking sector of the Republic of Serbia there were no significant changes – 778 to 866. While the number of the banks decreased in 2021 compared to the previous period – from 26 in 2020 to 23, the index rose from 795 to 866. Mergers and acquisitions had significant impact in the Montenegro banking sector on Herfindahl Hirschman index, from 991 in 2017 to 1460 and 1396 in 2020 and 2021, respectively. The highest value of Herfindahl Hirschman index is in the Croatia banking sector 1472 to 1641. Considering the Herfindahl Hirschman index values in Figure 7 it can be concluded that Serbia banking sector is characterized by an unconcentrated supply and Croatia and Montenegro banking sectors are characterized by a moderately concentrated supply.

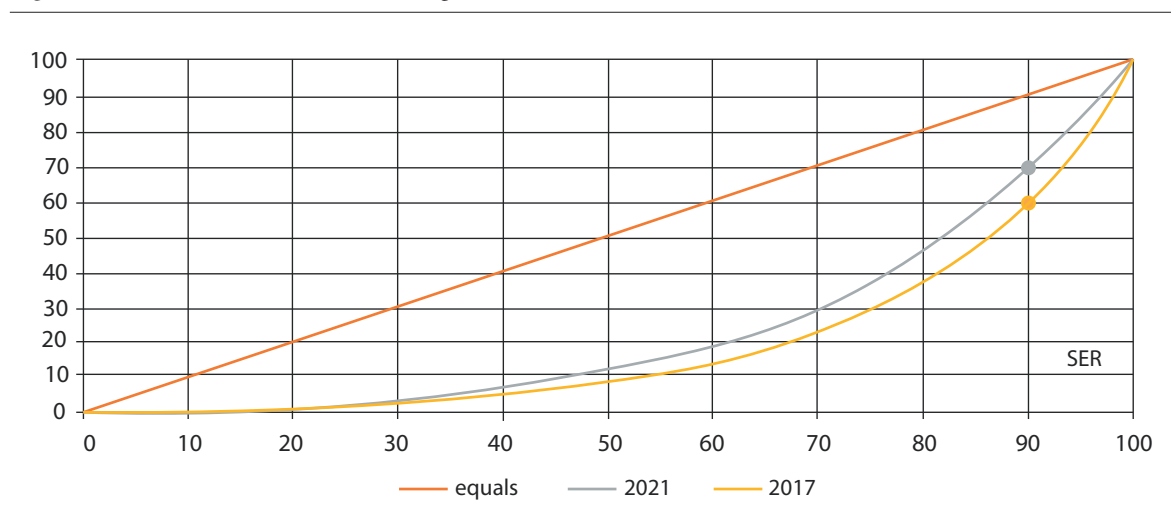
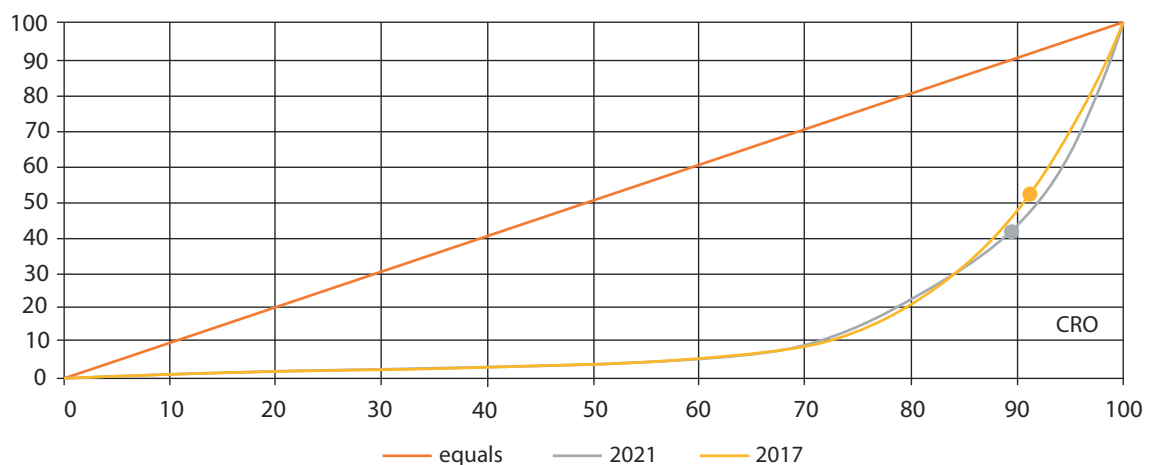
Figure 8. Lorenz curve for Serbia banking sector, 2017 vs 2021



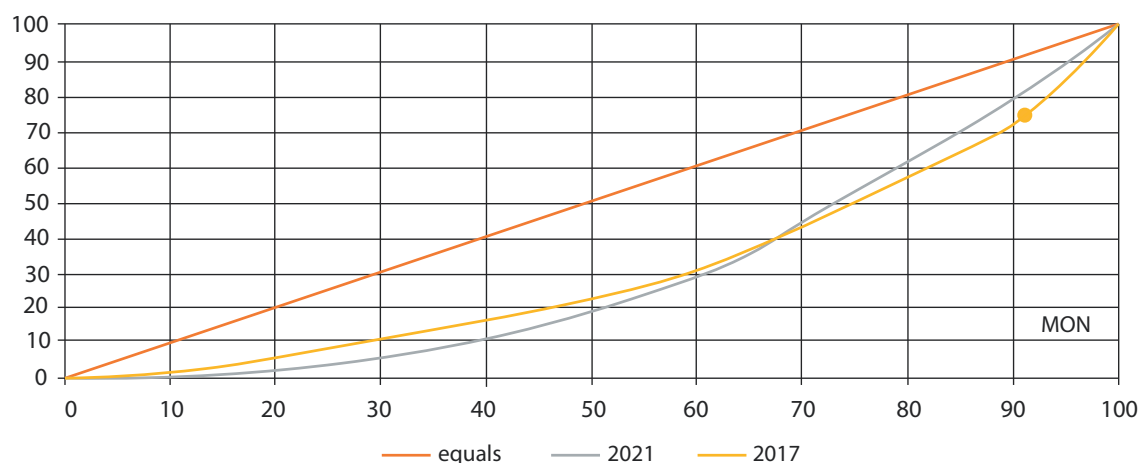
Figure 8 shows Lorenz curve for Serbia banking sector and Figure 9 for Croatia banking sector for 2017 and 2021. Lorenz curve “equals” in the graph represent hypothetical situation in which market shares among all banks would be equal. For example, if there were twenty-five banks operating on average, and every bank had 4% market share, Lorenz curve would be forty-five°. If Lorenz curve is closer to „equals“, dispersion is not so great and if Lorenz curve is moving away, dispersion becomes greater. As it can be seen in the Figure 8, dispersion of market shares between banks decreased from 2017 to 2021. However, it should be highlighted that the number of banks decreased in the analyzed period, from 29 in 2017 to 23 in 2021. 10% of banks with the largest market share in 2017 had about 40% market share and in 2021 it decreased to about 30%.

Figure 9. Lorenz curve for Croatia banking sector, 2017 vs 2021



Based on the Figure 9 it can be concluded that market shares dispersion did not change significantly but the 10% of the banks with largest market share had about 60% in 2017 and it decreased to about 50% in 2021.

Figure 10. Lorenz curve for Montenegro banking sector, 2017 vs 2021





Also, in Croatia the number of the operating banks decreased in the analyzed period. As it can be seen from the Figure 8 in 2021 the market share of the banks that are in the medium – not so high and not too low market share, increased slightly their share. Figure 10 shows Lorenz curve for Montenegro banking sector. As it can be seen, on one part Lorenz curve is closer to “equals” and on the other it has moved away. In 2021 only 11 banks operated in Montenegro bank sector and they could be divided into two groups – one with larger share and one with smaller share. Considering that the group of the banks that have smaller share decreased their cumulative market share and the other one increased.

CONCLUSION

In this paper different concentration measures were used in order to analyze concentration level in the banking sectors of Serbia, Croatia, and Montenegro during the period from 2017 to 2021. It can be concluded that these countries of the region differ in the degree of concentration and competition in banking. Compared to Montenegro and Croatia banking sector, Herfindahl - Hirschman index for Serbia banking sector is below 100. It means that the market is highly fragmented, with many small non-competitive banks that have not reached the volume of deposits and loans which provides sufficient potential for profitable business. On the contrary, in case of Croatia and Montenegro, there are low to moderate concentrated banking sectors. All of the analyzed countries tend to have greater values of HHI in future as long as the number of the banks that operate are decreasing.

The picture of concentration and competition in the banking market becomes clearer if the market share of the group of the largest banks is considered. If we look at the first four banks by market share, there are a great similarity between Croatia and Montenegro in the distribution of market share, while Serbia has a different market structure. The first four banks in Serbia hold about half of the market. The banking sectors of Croatia and Montenegro have already reached a high level of concentration, where the first four banks have a market share of about 70%. There are also many banks in Croatia with a very small market share. This market structure shows that the process of inevitable concentration of banks in Croatia has progressed further than in the other two observed countries.

Research findings suggest that consolidation of the analyzing banking sectors has not yet been completed. In the coming years, we can expect that there will be consolidation and concentration in the banking sector of Serbia, in which the most competitive banks will take significantly larger market share and improve profitability and business performance.



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MERE NIVOVA KONCENTRACIJE BANKARSKOG SEKTORA: EMPIRIJSKI REZULTATI SRBIJE, HRVATSKE I CRNE GORE

Rezime:

U poslednjih nekoliko godina došlo je do značajnih promena u finansijskom sektoru na globalnom nivou. Cilj ovog rada jeste analiza bankarskih sektora Srbije, Crne Gore i Hrvatske kao i uporedna analiza ovih sektora. U ovim zemljama najveći deo finansijskog sektora čini bankarski sektor. Vremenski period od 2017. do 2021. godine je obuhvaćen analizom, a odabrani odnosi koncentracije su izračunati kako bi se definisale tržišne strukture u ovim zemljama. Zbog spajanja i akvizicija u poslednjih nekoliko godina broj banaka je značajno opao. Prikazani rezultati statičke i dinamičke analize koncentracije pokazuju da su bankarski sektori Hrvatske i Crne Gore koncentrisaniji od bankarskog sektora Srbije. Značajan uticaj na strukturu tržišta ima smanjenje broja banaka. Ovo je zanimljiv podatak koji bi trebalo dodatno istražiti.

Ključne reči:

koncentracija,
konkurentnost,
tržišna moć,
bankarski sektor.