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INTERPLAY BETWEEN MARKET CONCENTRATION AND COMPETITIVE DYNAMICS IN THE BANKING SECTOR: EVIDENCE FROM SERBIA, CROATIA, ROMANIA AND THE CZECH REPUBLIC

Interakcija između tržišne koncentracije i stepena konkurencije u bankarskom sektoru – slučaj Srbije, Hrvatske, Rumunije i Češke

Abstract

The paper tests the fundamental premise of the SCP paradigm – whether there is a linear interplay between the variation of the degree of concentration and the degree of competition within the banking sectors in Serbia, Croatia, Romania and the Czech Republic, and how intense this interplay is, if it does exist. The analysis uses panel data for selected concentration indicators (the Herfindahl-Hirschman Index and the concentration ratio for the five largest banks) and concentration indicators analyzed on the basis of profitability indicators (the interest rate spread) for the 2009-2014 period. An isolated analysis of the degree of concentration indicators of the selected banking sectors indicates that Serbia displayed the lowest degree of concentration, while the highest one was recorded in Croatia. The results of testing the degree of quantitative agreement between the analyzed indicators of concentration and profitability show that the SCP paradigm was successfully proven in cases where it was not expected, considering the values of concentration and profitability indicators, which may primarily be explained by the specifics of the banking sectors in the analyzed European countries.

Keywords: *market concentration, competition, profitability, banking sector, the SCP paradigm*

Sažetak

U radu je testirano osnovno stanovište SCP paradigme – da li između varijacije stepena koncentracije i stepena konkurencije u okviru bankarskih tržišta Srbije, Hrvatske, Rumunije i Češke postoji linearna veza, kao i koji je smer i intenzitet ove veze ukoliko ona postoji. U analizi su korišćeni panel podaci za odabrane pokazatelje koncentracije (Herfindal-Hiršmanov indeks i racio koncentracije pet najvećih preduzeća) i pokazatelji konkurencije (kamatni spred, ROA, ROE) za period 2009-2014. godine. Izolovana analiza pokazatelja stepena koncentracije odabranih bankarskih tržišta ukazuje da je stepen koncentracije najniži u Srbiji, a najviši u Hrvatskoj. Rezultati ispitivanja stepena i smera kvantitativnog slaganja između analiziranih pokazatelja koncentracije i profitabilnosti ukazuju da je SCP paradigma uspešno dokazana u slučajevima u kojima to nije bilo očekivano, uzimajući u obzir vrednosti pokazatelja koncentracije i profitabilnosti. Navedeno se, pre svega, objašnjava specifičnostima bankarskih tržišta analiziranih evropskih zemalja.

Ključne reči: *tržišna koncentracija, konkurencija, bankarski sektor, SCP paradigma*

Introduction

The importance of banks for the functioning of the contemporary economic systems is remarkable. As financial intermediaries, banks mobilize free funds while, on the other hand, through allocations and investments, they distribute these funds in order to maximize their objective or profit. Because of its contribution to the optimal allocation of capital, the banking sector is the main pillar of the financial system in most countries. With regard to this, the ECB study of the banking sectors in the European Union member states [23] shows that, in terms of financial structure, the new Member States rely more heavily on bank finance than on direct market finance, as is the case in most EU-15 countries. Furthermore, the structure of the banking systems is dominated by commercial banks, holding approximately 90% share of total banking sector assets.

However, in the past few decades, significant changes have been analyzed in the banking sector that have occurred as a result of technological innovation, the processes of liberalization and privatization, but also of the problems caused by financial crises in the form of contraction in demand and narrowing of the credit market. Taking into account these factors, the present paper outlines basic trends typical of the banking sector since the beginning of the 21st century [27, pp. 1-44].

The analysis of the banking sector in the European Union indicates a declining trend in the number of credit institutions. In the ten-year period, from 2003 to 2013, the number of credit institutions decreased by 15%, from 9,054 in 2003 to 7,726 in 2013 [25], [24], which clearly shows a trend towards concentration of capital in banks, namely the consolidation of the banking sector. Although the report states that the process of consolidation largely occurs through mergers and acquisitions, it is interesting to note a decline in the activity of mergers and acquisitions as a global trend, both in terms of the number of transactions, as well as in terms of their values. The largest volume of mergers and acquisitions activity, measured by the number of transactions, was recorded in 2001, whereas the value of transactions peaked in 2007, due to the acquisition of the ABN Amro by the consortium of the Royal Bank of Scotland, Fortis and Santander, as well as the merger of Sanpaolo IMI and Banca Intesa, based on which the value recorded in 2007 amounted to over EUR 180 billion. After the outbreak of the global economic and financial crisis in 2008, the value of mergers and acquisitions exhibited a continuous decline, from EUR 39 billion in 2008 to merely EUR 8 billion in 2013 [24]. These trends suggest that the consolidation of capital in the banks actually occurred due to the consolidation of banks operating within the same group, rather than due to the activities of mergers and acquisitions.

In addition to the impact on the value of the consolidation transactions in the banking sector, the global crisis of 2008 also affected the value of total assets of banks in the European Union. By 2008, there was a trend of increase in total assets, while in the post-2008 period there was a change in the trend or a decrease in the value of assets of banks [25], [24].

Another one of the current trends in the banking industry is the transnationalization or transfer of banking activities abroad. The first forms of movement of capital to the banking sectors in other countries, in the form of the establishment of branches, appeared in the 1970s in the developed countries. However, the processes of transition, liberalization and privatization in the early 1990s intensified the transnationalization processes in the countries of South Eastern Europe, which increased the share of foreign capital in the banking sector of the countries in the region.

As a result of such trends, and particularly due to consolidation and transnationalization, there was an increase in the degree of concentration of the banking market. The analysis of the market of the European Union shows that the degree of concentration increased in the 2005-2013 period, with peak values in 2011, followed by a dip in 2012 and a recovery in 2013, resulting in a significant increase in concentration compared to the level before the crisis [24].

The global trend of increasing the level of concentration of the financial sector drew the focus of attention of scientists and experts towards the question of economic consequences thereof [43]. Accordingly, the subject of this paper is quantitative analysis of the interplay between the

variation of the degree of concentration and the degree of competition within the banking sectors in Serbia, Croatia, Romania and the Czech Republic, for a six-year period from 2009 to 2014, with the aim of testing the basic postulates of the SCP paradigm. As the indicators of concentration, the paper uses the Herfindahl-Hirschman Index (HHI) and concentration ratio of the five largest companies in the industry (CR_5). Since, based on literature review, it was concluded that the degree of competition in the banking sector is predominantly analyzed according to their profitability, the authors have agreed to approximate the level of competition by the interest rate spread, as an indicator that best illustrates basic functions of banks – as intermediaries. The level of the interest rate spread, as a difference between the average lending interest rates and the average deposit interest rates, reflects the degree of monopoly power that the bank possesses and is, consequently, a function of the degree of concentration of the banking sector as a whole [22]. Higher values of the interest rate spread are associated with the growth of the market power of banks, while lower values are characteristic for developed banks that operate effectively in a highly competitive marketplace [17, pp. 96-122], [52].

The paper consists of six sections. The introductory considerations are followed by the second section with a review of the literature pertaining to measuring the degree of concentration and a study of the links between the level of concentration and other economic indicators. The third section exhibits the methodological framework for measuring the concentration – defines the relevant market and describes concentration ratios used in the paper. The fourth section refers to an empirical analysis of the degree of concentration and competition in banking markets in the selected European countries. The fifth and sixth sections analyze the results and provide concluding observations and recommendations for further research in this field.

Literature review and research design

The development of technological and financial innovations and strong deregulation of the financial sector resulted in an increase of concentration and, consequently, the creation of large financial conglomerates in the banking sector [9, pp. 2191-2214]. The issue of the impacts of market concentration on social welfare has captured the attention of scientific circles since the mid-20th century.

In his study, Kraft [29] systematically analyzed basic directions of development of the theories that examined this effect. Pioneering analyses of the effects of concentration were carried out in the 1930s and 1940s. The traditional theory of industrial organization associated the increase of concentration directly to the growth of the market power of the participants. The authors whose studies were used as bases for the oligopoly theory stated that competitors, through various forms of strategic behavior, influence both the increase in their own profitability, and a reduction in overall social welfare. In his study, Bain [2, pp. 293-324] concluded that, as a rule, activities with a higher degree of concentration generate higher profits.

The development of economic thought in the coming period resulted in a change of the public view of exclusively negative consequences that the increase of market power may have on social welfare. Thus, an increase in the size of a company increases its potential for innovation [48], but also for a more effective operation [16, pp. 356-390], [14, pp. 134-137], [53, pp. 818-833]. In addition, the development of the theory of unrestricted competition [5] introduced the entry of potential competitors in the market into the analysis. The proponents of this theory believed that the mere possibility of entry of a new competitor into the market significantly increases the level of competition between the existing market participants. The existence of threats of penetration of new participants into the market, if the existing ones raise their prices, may lead to outcomes which are very similar to those in markets with perfect competition. The study showed that even in activities with a relatively small number of participants, fierce competition may exist.

Due to the specific nature of banking activities, the experts do not share a uniform opinion on the need for a greater or lesser degree of concentration in the sector. Some authors [34, pp. 169-176] present arguments in favor of the increased level of market concentration (pro-concentration theories). Others [15, pp. 38-48] note that the level of concentration in the banking sector is undesirable

from a social point of view (cons-concentration theories). Guided by the authors Sharma and Bal [49, pp. 95-107] and Tushaj [52], the following part of the paper shall state the most significant views of the two schools of thought.

Advocates of increased concentration of the banking sector believe that capital consolidation in banks occurs as a result of the efforts to achieve economy of scale and increase business efficiency. A less concentrated banking market, with a large number of small banks, is more prone to banking crises than the banking market dominated by a few large banks. The above is explained by the fact that big banks have the potential to diversify their portfolio more effectively. In addition, proponents of this idea consider that it is easier to supervise a few large banks than a large number of small banks, which results in the reduction of risks stemming from inadequate prudential supervision of the banking sector.

On the other hand, numerous empirical studies link the concentration of the banking market with a reduction in credit supply, an increase in lending and a reduction in deposit rates. This results in a growth in profitability of the banking operations and a decrease in economic welfare of society. Furthermore, opponents of increased concentration in the banking sector have noted the falsity of the hypothesis which argues in favor of an easier supervision over a small number of large banks. They point out that if the size of a bank is positively correlated with the growing complexity of banking operations, supervision of large banks can become very complicated.

However, one of the basic questions related to the issue of growth of market power is how the increase in the degree of concentration of a particular market affects the level of competition. This issue has been relevant for numerous authors; thus, over time, two basic approaches were established in literature – the structural and the non-structural approach.

The structural approach relies on the SCP paradigm (structure-conduct-performance paradigm) and the hypothesis on the efficiency of structures, originally developed by the authors Mason [33, pp. 61-74] and Bain [3]. The proponents of the application of this approach determine the degree of competition between the banks based on the research of market structures and the degree of market concentration (in terms of selected concentration ratios). In essence, this approach is based on the interplay between concentration and competition, with the assumption that the degree of market concentration is inversely related to the level of competition [1, pp. 566-579]. In other words, in a highly concentrated market, the degree of competition between the participants is lower (structure-conduct), which leaves room for the banks to claim more profits (performance). In contrast, the structure-conduct-performance hypothesis assumes a different direction of the interplay between market structure and business performance. According to this hypothesis, the superior performances are due to more efficient operation of large banks in comparison to small banks, and the growth of market power (increased level of concentration) is a direct consequence of conducting operations in a more efficient manner.

On the other hand, non-structural approach is based on researching competitiveness and bank behavior without the use of structural variables and ignoring the degree of market concentration. Within this approach, authors often use the Lerner Index [30, pp. 157-175], Panzar-Rosse [44, pp. 443-456], Iwata [28, pp. 947-966] and Bresnahan [12, pp. 87-92] model.

Recent studies that have examined the effects of market concentration showed that the growth of the market power of banks may result from the diversification of the banking sector [4, pp. 340-362]. These authors state that the banks which, in addition to the standard products, also offer other financial services (brokerage, insurance, etc.) as a rule have greater market power than the banks which only offer traditional banking services. In addition, numerous studies [31, pp. 31-77] revealed that there is a relation between the structure of the banking sector and economic growth.

On the other hand, in certain studies [19, pp. 563-583], [18] the authors consider that the degree of competition in the banking system and stability thereof depend on entry barriers, including on foreign ownership and the severity of activity restrictions, as well as the importance of other financial institutions (finance companies, merchant banks, insurance companies, capital markets). Furthermore, in their studies these authors find no evidence that banking system concentration negatively relates to competitiveness.

Based on a detailed review of the literature, it may be noted that in many cases the interplay between concentration and competition really is tantamount to reviewing the interplay between concentration and profitability, which stems also from the premises of the SCP paradigm. In this sense, the theoretical literature has developed two theories that explain the interplay between concentration and profitability in two different ways:

1. The market-power theories that promote a positive correlation between concentration and profitability, within which we distinguish between two aspects:

    1.1. The SCP (structure-conduct-performance hypothesis) – although the SCP paradigm has already been discussed, in terms of the interplay between concentration and profitability the SCP paradigm argues that the market that is more concentrated has higher prices as a result of competition imperfections in such market, i.e. the degree of concentration and profitability are positively correlated.

    1.2. The RMP (relative-market-power hypothesis) assumes that only companies with a large market share and differentiated products can charge higher prices and earn "supernormal" profits.

2. The theories that belong to the second group hold that the interplay between concentration and profitability is based on efficiency, the so-called efficient-structure hypothesis. Such theories are contrary to the previous ones that negate the effects of concentration on profitability.

    2.1. The X-efficient version – Companies with superior management or superior production technology achieve lower costs and thus higher profits. These companies also achieve greater market shares, which may result in higher levels of concentration. Within this variant – the efficient-structure hypothesis, the profit-structure interplay is irrelevant because it encourages efficiency and greater profitability and market shares.

    2.2. The scale-efficiency version – Companies essentially dispose of equally good management

and technology, but some companies simply produce on a more effective scale and consequently have lower costs and higher profits. These companies achieve greater market shares, which increases concentration.

Bearing in mind the fact that "The research usually specified bank prices and measures of profitability as the endogenous indicators of bank conduct and performance, respectively." [8, p. 1], as well as a great amount of research by other authors [51, pp. 69-83], [7, pp. 404-431], [13, pp. 115-134], the authors have decided that the focus of this study should be a review of the basic assumption of the SCP paradigm on an inverse correlation between concentration and competition based on testing the strength of connections between concentration and profitability, which, according to the SCP paradigm, is positive.

In this sense, one of the fundamental questions is which indicator of profitability to choose, so that it can adequately reflect the level of competition in the market. Searching for the answer to this question, the authors noted that the interest rate spread contains information on the efficiency of the process of financial intermediation, the profitability of the banking sector and the impact of monetary policy on banking activities [54, pp. 73-82], and that the amount of interest rate spread reflects the degree of monopoly power that the bank possesses [22], which makes this indicator an adequate indicator of profitability or competition in the banking market.

Empirical research suggests that the relatively strong correlation between the size of banks and the height of interest rate spread is characteristic for banking markets dominated by several large banks [54, pp. 73-82]. In support, the author Belaisch [6] tested in his study the hypothesis that the anti-competitive banking market is characterized by high values of interest rate spread which reduces the volume of deposits and loans. This is also confirmed in the SCP paradigm which implies that market concentration is positively correlated with the amount of interest rate spread [47, pp. 1-10].

Accordingly, the authors have decided to use the interest rate spread as an indicator of profitability of the banking sector and, therefore, of the degree of competition in the market. This is corroborated by the report of the

IMF, a part of which states that the interest rate spread can be used for assessment of profitability and price behavior of banks [11]. Taking into account the tendency of central banks to increase transparency of the banking sector, commercial banks are forced to provide more detailed information both on the level of interest rates and interest rate spread, so that there are no hidden costs. Therefore, the interest rate spread is a more relevant indicator of profitability of the banking sector compared to traditional indicators of profitability – the ROA and ROE, which are subject to accounting manipulations.

Taking into account the aim and purpose of this paper, the *research question* is: Is there a linear correlation between concentration and competition (measured by profitability), as well as what is its intensity, if any? The basic hypothesis is set as follows.

The hypothesis. A greater degree of concentration of the banking sector is associated with higher profitability of banks operating in this market, which is negatively reflected on competition.

The above hypothesis shall be tested in the banking sectors of the four selected European countries based on the data downloaded from the websites of the central banks in these countries, for a six-year period between 2009 and 2014.

Methodological framework for measuring concentration

Despite the fact that the Panzar-Rosse model is the most widely used tool for testing the degree of market concentration and the level of competition in the banking sector [32, pp. 371-384 according to 50, pp. 41-50] this model entails several limitations for which reason it cannot be used for calculating the degree of concentration of the banking sector. Authors Lončar and Rajić [32, pp. 371-384 according to 10] suggest the following. The model assumes that each bank offers one product only. In addition, the model assumes that all banks have the same cost function. Finally, it was empirically confirmed that the model often erroneously assessed the level of competition depending on the degree of market concentration.

Accordingly, when analyzing the degree of concentration of the banking sector in Serbia and the selected European countries, this paper shall apply the structural approach, in which concentration ratios play a central role in explaining the structure of the market. The starting point in determining the degree of market concentration within the structural approach, and consequently the conditions of competition prevailing in it, shall be a clear definition of the relevant market.

Defining the relevant market is the basis for calculating market concentration indicators, competition analysis and application of competition rules. In practice, it is extremely important to determine precise boundaries of the relevant market. Within the EU legislation [56], the European Commission defined the relevant market as follows: The relevant market is the market comprising relevant product market and the relevant geographic market, from which we conclude that the determination of the relevant market involves establishing two dimensions of this market – the relevant product market and the relevant geographic market. Relevant product market is a set of goods or services that consumers consider interchangeable in terms of their properties, the usual purpose and price, while the relevant geographic market is the territory in which market players offer products and services, and is subject to the same or similar conditions of competition.

When defining relevant product market for the banking sector, in order to simplify the calculations, the most frequently used approach is the one that takes into consideration the criterion of holding the banking license. In other words, it means that, when calculating concentration indicators, all banks that hold the license are considered, regardless of the fact that some of them have expanded their activities portfolio into other segments of financial activities. On the other hand, certain financial institutions (e.g. insurance companies in the segment of life insurance) offer products that may be considered as substitutes for certain banking products. By applying the criterion of holding the banking license, however, these institutions shall not be considered in this study. Furthermore, the relevant geographic market shall be the entire territories of the analyzed countries.

Analysis of the banking sectors in Serbia, Croatia, Romania, and the Czech Republic

The early 1990s, with the onset of the transition process in Central and Eastern Europe (CEE), marked the beginning of the reform mechanism of their respective banking sectors, which included the creation of new regulatory systems and privatization of state-owned banks, paving the way for the arrival of foreign banks in the market of these countries. As a result, significant changes occurred in the structure and characteristics of the banking sectors in these countries, which may be reflected in the level of their concentration, as well as the competition therein. As noted above, in order to provide answers to the research question and test the hypothesis, we are going to analyze the banking sectors in the four selected countries in the six-year period between 2009 and 2014.

In the early 2000s, the banking market in Serbia was characterized by a large number of banks, real insolvency of the largest banks, high illiquidity, lack of an adequate system or presence of an inadequate system of internal supervision of bank operations, inadequate risk management system, as well as improper operations [38]. As of 2001, significant changes occurred in the banking sector in the form of closure of a number of banks that lost their banking license, capital consolidation (through mergers and acquisitions), entry of foreign banks due the active policy of liberalization and other activities which improved the structure of the banking sector in Serbia. As a result of these trends, in the period from 2001 to 2004, the number of banks in the Serbian market halved and this trend continued in the coming years. The downward trend in the number of banks[1] was observed in the rest of the analyzed countries, as well, which makes testing the degree of concentration of the banking market a topical and important issue.

Along with the process of reducing the number of banks, changes also occurred in the ownership structure of the banks in the analyzed countries, in terms of increasing the share of foreign-owned banks. The dominant role of foreign banks is also evidenced by the data from a Raiffeisen Bank study [46]. If we observe the data for 2014, they show that the share of foreign banks in the total assets of banks varied from 75% (in Serbia) to 90% (in Romania). Among the analyzed countries, the share of state-owned banks in the total assets was the largest in Serbia (19.2%), followed by Romania where the share of state-owned banks was lower than in Serbia by up to more than ten percentage points and amounted to 8.8%, while in the Czech Republic it amounted to merely 2.3%.
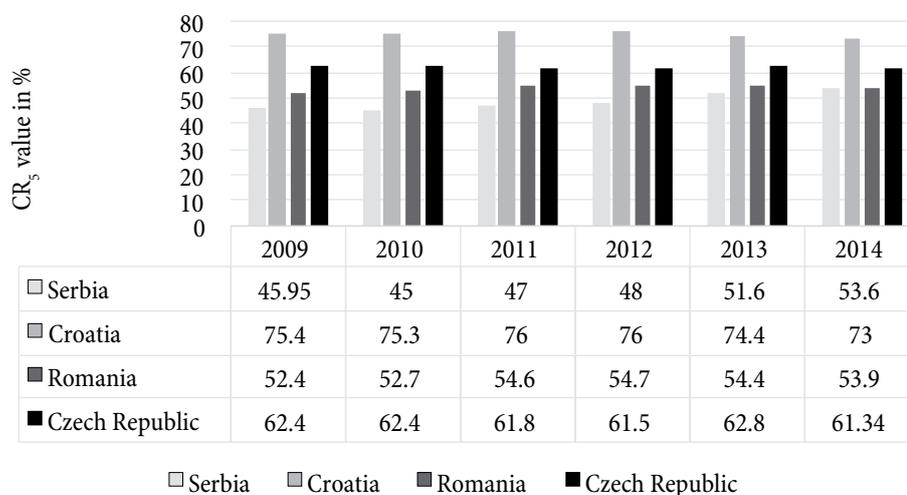
An important indicator of the state of the banking sector is the value of total assets, loans and deposits. The values of these balance sheet items (see Figure 1) indicate

Figure 1: Value of total assets, loans and deposits in the period from 2009 to 2014 (in million EUR)
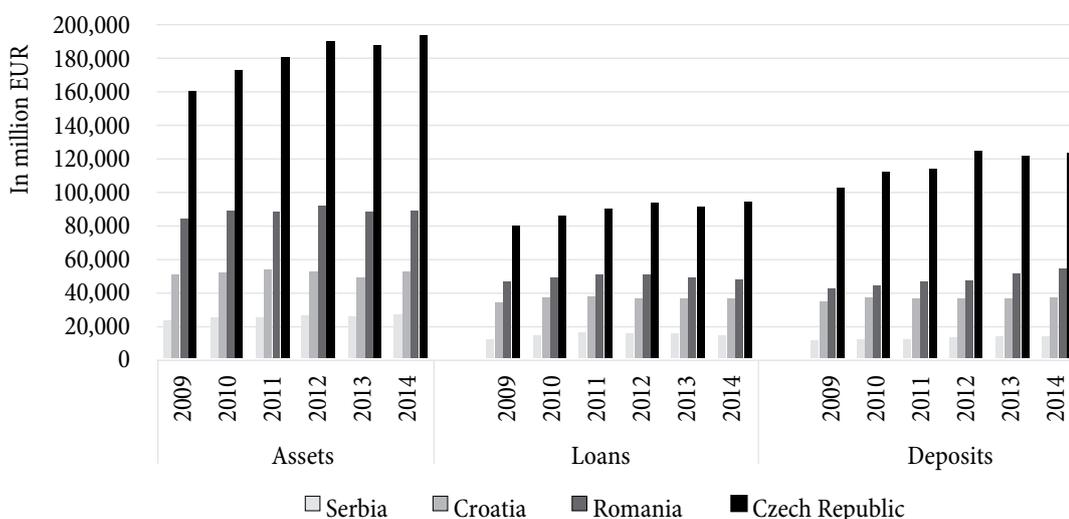
Source: The authors' calculations based on data obtained from the study: Raiffeisen Research (2014) CEE Banking Sector Report [45] and Raiffeisen Research (2015) CEE Banking Sector Report [46].

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1 According to the data for 2014, 29 banks were operating in Serbia, 28 in Croatia, 39 in Romania, and 45 in the Czech Republic.

Figure 2: Value of the CR_5 for assets in the period from 2009 to 2014 (in %)

	2009	2010	2011	2012	2013	2014
☐ Serbia	45.95	45	47	48	51.6	53.6
☐ Croatia	75.4	75.3	76	76	74.4	73
■ Romania	52.4	52.7	54.6	54.7	54.4	53.9
■ Czech Republic	62.4	62.4	61.8	61.5	62.8	61.34

☐ Serbia   ☐ Croatia   ■ Romania   ■ Czech Republic

Note: The data for Croatia for 2014 represent an estimated value; the data for Romania for 2014 refer to the first two quarters.
Source: The authors' calculations based on the data downloaded from the central banks' websites [20], [21], [36], [37], [39], [40], [41], [42], except for the Czech Republic for 2014, which was retrieved from the website of the European Central Bank [26].

the presence of large differences in the characteristics of the banking sectors of the analyzed countries. In the overall analyzed six-year period, Serbia recorded the lowest values of assets, loans and deposits, while the value of these accounting items was highest in the Czech Republic. By observing Figure 1, it can be undoubtedly concluded that, based on the criteria of the value of total assets, loans and deposits, the banking sector of the Czech Republic was the most developed one of all the countries in the analyzed group.

Taking into account the abovementioned features of banking sectors in the analyzed countries, the relevant question is the degree of concentration of these markets. As already stated, with regard to the availability of data, the authors decided to analyze concentration using two indicators, the CR and the HHI, whereby the concentration ratio refers to the five major banks (CR_5).
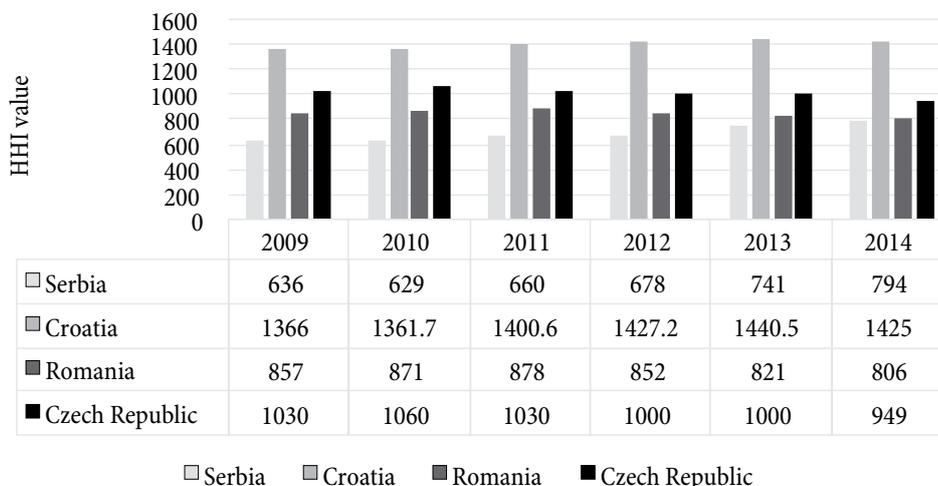
For the period from 2009 to 2014, average concentration ratio of assets of the five leading banks in the analyzed group of countries was 60.04%, which was almost identical to the median value in the European Union in the same period. The value of the CR_5 for the analyzed countries in the analyzed period (see Figure 2) indicates that, in the period from 2009 to 2014, Serbia achieved the lowest concentration ratio values for the five leading banks, which leads to the conclusion that, according to this indicator, the degree of concentration of the banking market in Serbia was the lowest. However, taking into account the

shortcomings of this indicator, a more realistic picture of the degree of concentration of the banking sector in the analyzed countries is obtained by comparing the values of the HHI (see Figure 3). It is evident that, in the period from 2009 to 2014, Serbia recorded the lowest values of the HHI, which confirms the previous conclusion that, in the analyzed group of countries, Serbia displayed the lowest degree of concentration. If we take into consideration both the CR_5 and the HHI, the degree of concentration was the highest in Croatia. It is interesting to note that the average value of the HHI for assets in Serbia, from 2009 to 2014, was lower than the average value of this indicator for the European Union in the same period (690 in Serbia, compared to 1,100[2] in the European Union).

Although the awareness of the level of market concentration was very important, testing the impact that concentration had on the entire banking sector was even more significant. Considering that the aim of this paper was to investigate the existence of a negative correlation between concentration and competition, based on a review of the (positive) connection between concentration and profitability, the authors have decided to approximate the level of competition by the interest spread in this paper. The relevance of using the interest rate spread as an indicator that reflects the level of profitability and

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2   Based on the authors' calculations derived from data downloaded from the website of the European Central Bank.

Figure 3: Value of the HHI for assets for the period from 2009 to 2014

	2009	2010	2011	2012	2013	2014
□ Serbia	636	629	660	678	741	794
□ Croatia	1366	1361.7	1400.6	1427.2	1440.5	1425
■ Romania	857	871	878	852	821	806
■ Czech Republic	1030	1060	1030	1000	1000	949

□ Serbia   □ Croatia   ■ Romania   ■ Czech Republic

Note: The data for Croatia for 2014 represent an estimated value; the data for Romania for 2014 refer to the first two quarters.
Source: The authors' calculations based on the data downloaded from the central banks' websites [20], [21], [36], [37], [39], [40], [41], [42], except for the Czech Republic for 2014, which was retrieved from the website of the European Central Bank [26].

the degree of competition in the banking markets was previously discussed in Section 2 of the present paper.

Observing the value of the interest spread for all four analyzed countries in the period from 2009 to 2014 (see Table 1), it can be concluded that, from 2009 to 2012, the highest difference between average lending and the average deposit interest rate was recorded in Croatia. Bearing in mind the previously stated conclusion that Croatia displayed the highest level of concentration in the analyzed group of countries, it may be established intuitively that high concentration was related to a lower level of competition. However, in 2012, the value of interest rate spread was the same for Serbia and Croatia, while in the two following years, Serbia recorded the highest value of this indicator. It should also be noted that, in this period, the degree of concentration in Serbia revealed a tendency to increase, as well. On the other hand, the Czech Republic recorded the lowest value of the interest rate spread, unlike the indicators of concentration, which might have been expected according to the SCP paradigm.

Taking into account the abovementioned characteristics of the banking sector in the analyzed countries in Central and Eastern Europe, it is clear that the question of the impact of concentration on competition deserves special attention, and it is further analyzed in Section 5, where a link between concentration and competition is empirically tested based on the data referred to in the present section.

Testing correlation between concentration indicators and competition indicators

Based on the data presented in Section 4 of this study, we have conducted a correlation analysis, the results of which are presented in Table 2.

Most studies have indicated that there was a negative correlation between concentration and profitability, which suggests that the SCP paradigm is not valid. What may be true is that certain profitability indicators (the interest rate being the most often used one) are higher in a more concentrated market. It is safe to say that this theoretical

Table 1: Interest rate spread (in %)

		2009	2010	2011	2012	2013	2014
Interest rate spread	Serbia	6.70	6.00	7.40	7.60	9.20	8.00
	Croatia	8.40	8.60	8.00	7.60	7.70	7.40
	Romania	5.30	6.80	5.80	5.80	6.00	5.40
	The Czech Republic	4.70	4.80	4.70	4.40	4.10	3.90

Source: The data has been downloaded from the website of the World Bank [55], with the exception of the data for Croatia for the year 2014, which was retrieved from the website of the Croatian National Bank [35].

Table 2: Correlation matrix

Serbia

	Interest rate spread	HHI	CR_5	$HHI*CR_5$
Interest rate spread	1			
HHI	0.7703	1		
CR_5	0.8202	0.9958	1	
$HHI*CR_5$	0.7783	0.9997	0.9973	1

Croatia

	Interest rate spread	HHI	CR_5	$HHI*CR_5$
Interest rate spread	1			
HHI	-0.4854	1		
CR_5	0.8426	-0.3756	1	
$HHI*CR_5$	0.0657	0.7806	0.2861	1

Romania

	Interest rate spread	HHI	CR_5	$HHI*CR_5$
Interest rate spread	1			
HHI	0.3958	1		
CR_5	-0.1177	-0.2172	1	
$HHI*CR_5$	0.3132	0.8484	0.3324	1

The Czech Republic

	Interest rate spread	HHI	CR_5	$HHI*CR_5$
Interest rate spread	1			
HHI	0.9359	1		
CR_5	0.2843	0.5541	1	
$HHI*CR_5$	0.8711	0.9841	0.6929	1

Source: Authors' calculation

statement adequately describes the situation in the Croatian banking market. Specifically, in the case of Croatia, which exhibited the highest degree of concentration among the analyzed countries, there was a strong positive correlation between the interest rate spread and the CR_5 but the value of the correlation coefficient between the HHI x CR_5, as a comprehensive indicator of concentration, on one hand and the interest rate spread on the other was very close to zero, which indicates a negligible correlation between concentration and profitability indicators, and suggests that changes in the value of concentration indicators were not associated with changes in the value of profitability indicators. Given that the interest rate spread is highly positively correlated with the CR_5 but negatively correlated with the HHI as an overarching indicator of concentration, we came to the conclusion that the leading five banks achieved high profits, which may lead to the conclusion that the Croatian market was characterized by oligopolization.

The Czech Republic recorded the lowest value of the interest spread throughout the analyzed period, which,

combined with a large number of banks operating in the market, may lead to the conclusion that intense competition in the banking market reduced profitability. If we observe the correlation coefficient values obtained, we may conclude that there was a strong positive correlation between the HHI x CR_5 and the interest rate spread, which supports the SCP paradigm. This result may be unexpected, given that the concentration indicators revealed that the degree of concentration in the Czech market was not the lowest among the analyzed countries, which might have been expected in accordance with the SCP paradigm. The explanation lies in the fact that the concentration in the Czech market was more intense than in Serbia and Romania, but not intense enough to result in a conclusion on the rejection of the SCP paradigm. It is interesting to note that the correlation between the interest rate spread with the HHI was significantly higher than with the CR_5 (0.94 versus 0.28), which indicates that the largest players in the market did not dictate the rules of the game by appropriating high profits for themselves, but rather by

a price war which reduced the difference between the lending and deposit interest rates.

Practically during the entire analyzed period (except for 2010), following the Czech Republic, Romania was the country that recorded the second lowest values of the interest rate spread, which, on average, was 5.85 (compared to 4.43 in the Czech Republic), suggesting that Romania's competition was more intense than the ones in Serbia and Croatia. The analysis has shown that the correlation between the interest rate spread and concentration of individual indicators, as well as the correlation between the interest rate spread and the HHI x CR_5 within the limits was negligible and very weak, suggesting the irrelevance of interplay between concentration and profitability, as emphasized by numerous authors.

If we observe the market in Serbia, it is noticeable that its banking sector recorded the lowest values of concentration indicators which, according to the SCP paradigm, should be associated with lower levels of profitability. However, the value of the interest rate spread indicated that the profitability of the banking sector in Serbia was very high, and that in 2013 and 2014, it was the highest among the analyzed countries, which intuitively might lead to the conclusion that the SCP paradigm would be refuted. However, the correlation analysis showed that the interest rate spread correlated both with the HHI and the CR_5 and the HHI x CR_5 highly positively, leading to a conclusion that there actually was a positive interplay between concentration and profitability, namely that the SCP paradigm was successfully demonstrated. Such result is explained by the characteristics of the banking market in Serbia which, despite dispersed market participation, displayed slow competitive dynamics in the industry, indicating possible existence of indirect oligopolization and market cartelization. This brings us to the conclusion that the interplay between concentration and profitability does not necessarily depend on the number of players in the market and their respective market shares, but rather on the way in which market participants are organized. If there is a greater degree of cooperation among the players, in terms of maintaining a common pricing policy, then the profitability of the given banking market will be higher even though the concentration ratios suggest a lower level of concentration.

Bearing in mind the presented research results, it may be concluded that the SCP paradigm, and hence the hypothesis, as described in Section 2 of this paper, was successfully demonstrated in the case of the Czech Republic and Serbia, while the Romanian market exhibited low, almost negligible interplay between concentration and competition and profitability, and this situation was even more pronounced in the case of Croatia. These results, although in certain instances unexpected, are explained by market specifics in the analyzed countries, especially price policy and the effects of the mutual cooperation of the banks that operate in these markets.

Conclusion

Under the influence of the process of globalization, liberalization and transition, the banking sectors of countries around the world have undergone paramount changes which have triggered a number of issues, one of the most topical ones being testing the degree of concentration and its impact on the level of competition and social prosperity. Research of the concentration of the banking sector is particularly important for countries in transition that initiated the process of liberalization of the banking market in the 1990s by allowing foreign banks to enter the markets, with possible significant implications for the level of competition. Accordingly, the study included an analysis of the banking sectors of three countries from the region of South Eastern Europe – Serbia, Croatia, and Romania, and one country from Central European region – the Czech Republic.

A dynamic analysis of the degree of concentration conducted by examining trends in the HHI and the CR_5 indicators in the six-year period from 2009 to 2014 for the selected European countries revealed that the degree of concentration measured by the indicators listed was the lowest in Serbia and the highest in Croatia. On the other hand, the analysis of the degree of competition, based on the analysis of the trends in the difference between the lending and deposit interest rates, indicated that the Czech banking market was the least profitable one. The highest

values of this indicator in the period from 2009 to 2011 were recorded in Croatia, while in 2012, the value of the interest rate spread was the same for Serbia and Croatia, and in subsequent years, the highest recorded values for this indicator in the analyzed group of countries were those for Serbia.

This statement is confirmed by the results obtained by examining the degree of correlation between the level of concentration and the degree of competition, measured by a profitability indicator of the banking sectors in the analyzed countries. The results are not unambiguous, and in most cases, they deviate from what might have initially been expected. Thus, in the case of Serbia, the SCP paradigm was successfully demonstrated even though the Serbian banking market was characterized by the lowest level of concentration, while the value of the interest rate spread was very high, which is explained by the cooperation between market participants and their agreeing on the price policies they adhered to. On the other hand, the lowest interest rate spread in the Czech Republic was not accompanied by very low concentration indicators; nevertheless, the SCP paradigm was demonstrated, which was explained by the fact that concentration was intense but not intense enough for the SCP paradigm to be rejected, as well as the fact that there was a possibility that participants were involved in market price war which lowered profitability. In contrast to these results, in Croatia, a demonstration of the SCP paradigm could have intuitively been expected since the Croatian banking sector exhibited the highest degree of concentration among the analyzed countries, while the value of the interest rate spread was high. However, the results of the correlation analysis showed a negligible correlation between the concentration and profitability indices, which was explained by the fact that high value of the interest rate spread did not affect the profit sufficiently so as to result in a positive conclusion regarding concentration and profitability. The analysis of the banking sector in Romania also showed that the interplay between concentration and profitability, i.e. competition, was almost negligible, as many authors were trying to prove.

This indicates that the conclusions about the interplay between concentration and competition cannot be made solely on the basis of the results of a quantitative analysis, and that the way in which the market participants are organized represents an important factor, as well.

The paper may serve as a basis for further research into this area. It would be interesting to examine how the introduction of new banking services and financial innovations arising from such services (brokerage, the sale of insurance and the like) would influence the level of concentration in the banking sector. In addition, future research might be focused on the development of the model which examines the interplay between concentration and profitability. In this sense, it would be possible to observe a wider time frame and more countries, but also to test the interdependence of these categories by using the panel model. The panel model would allow separate consideration of individual and time effects of concentration on profitability in the banking sector.

Since further consolidation of the banking sectors in the region is expected, the issue of concentration of the banking sector will be topical in the future, as well.

References

1. Andries, M. A., & Capraru, B. (2014). The nexus between competition and efficiency: The European banking industries experience. *International Business Review, 23(3)*, 566–579.

2. Bain, J. (1951). Relation of profit rate to industry concentration: American manufacturing, 1936-1940. *Quarterly Journal of Economics, 65(3)*, 293–324.

3. Bain, J. (1956). *Barriers to new competition.* Cambridge: Harvard University Press.

4. Barbosa, K., De Paula Rocha, B., & Salazar, F. (2015). Assessing competition in the banking industry: A multi-product approach. *Journal of Banking & Finance, 50*, 340–362.

5. Baumol, W., Panzar. J., & Willig, R. (1982). *Contestable markets and the theory of industry structure.* New York: Harcourt Brace Jovanovich.

6. Belaisch, A. (2003). *Do Brazilian banks compete?* (IMF working paper 03/113). Washington DC: IMF.

7. Berger, N. A. (1995). The profit-structure relationship in banking – Tests of market-power and efficient-structure hypothesis. *Journal of Money, Credit and Banking, 27(2)*, 404-431.

8. Berger, N. A., Demirguc-Kunt, A., Levine, R., & Haubrich, G. J. (2004). Bank concentration and competition: An evolution in the market. *Journal of Money, Credit and Banking, 36(3)*, 433-451.

9. Bikker, J. A., & Haaf, K. (2002). Competition, concentration and their relationship: An empirical analysis of the banking industry. *Journal of Banking and Finance, 26(11)*, 2191-2214.

10. Bikker, J. A., Spierdijk, L., & Finnie, P. (2006). *Misspecification of the Panzar-Rosse model: Assessing competition in the*

banking industry (DNB working paper 14). Amsterdam: De Nederlandsche Bank.

11. Boldbaatar D. (2006). *Measurement and implication of commercial banks' interest rate spread in selected SEACEN countries* (SEACEN research paper 64). Malaysia: SEACEN.

12. Bresnahan, T. F. (1982). The oligopoly solution concept is identified. *Economics Letters*, *10(1-2)*, 87-92.

13. Carbo, S., Humphrey, D., Maudos, J., & Molyneux, P. (2009). Cross-country comparison of competition and pricing power in European banking. *Journal of International Money and Finance*, *28(1),* 115-134.

14. Casu, B., & Girardone, C. (2009). Testing the relationship between competition and efficiency in banking: A panel data analysis. *Economics Letters, 105(1)*, 134–137.

15. Cetorelli, N. (2001). Competition among banks: Good or bad?. *Economic Perspectives*, *25(2)*, 38-48.

16. Chen, X. (2007). Banking deregulation and credit risk: Evidence from the EU. *Journal of Financial Stability*, *2(4)*, 356-390.

17. Chirwa E. W., & Mlachila M. (2002). *Financial reforms and interest rate spreads in the commercial banking system in Malawi* (IMF staff papers 51/1). Washington DC: IMF.

18. Claessens S. (2009). *Competition in the financial sector: Overview of competition policies* (IMF working paper 09/45). Washington DC: IMF.

19. Claessens S., & Laeven L. (2004). What drives bank competition? Some international evidence. *Journal of Money, Credit and Banking*, *36(3)*, 563-583.

20. Czech National Bank. *ARAD public database*. Retrieved from http://www.cnb.cz/docs/ARADY/HTML/index_en.htm

21. Czech National Bank. *Financial market supervision report* (various years). Retrieved from https://www.cnb.cz/en/supervision_financial_market/aggregate_information_financial_sector/financial_market_supervision_reports/index.html

22. Da Silva G. J. C., Oreiro J. L., De Paula L. F., & Sobreira R. (2007). *Macroeconomic determinants of banking spread in Brazil: An empirical evaluation* (working paper 0066). Brasil: Universidade Federal do Paraná.

23. European Central Bank. (2005). *Banking structures in the new EU member states*. Retrieved from https://www.ecb.europa.eu/pub/pdf/other/bankingstructuresnewmemberstatesen.pdf

24. European Central Bank. (2014). *Banking structures report*. Retrieved from https://www.ecb.europa.eu/pub/pdf/other/bankingstructuresreport201410.en.pdf

25. European Central Bank. (2008). *EU banking structures*. Retrieved from https://www.ecb.europa.eu/pub/pdf/other/eubankingstructures2008en.pdf

26. European Central Bank. *Structural financial indicators*. Retrieved from https://sdw.ecb.europa.eu/home.do

27. Hawkins, J., & Mihaljek, D. (2001). *The banking industry in the emerging market economies: Competition, consolidation and systematic stability: an overview* (BIS working paper No. 4). Basel: BIS.

28. Iwata, G. (1974). Measurement of conjectural variations in oligopoly. *Econometrica*, *42(5)*, 947–966.

29. Kraft, E. (2006). *How competitive is Croatia's banking system?* (working papers W – 14 March 2006). Croatia: Croatian National Bank.

30. Lerner, A. P. (1934). The concept of monopoly and the measurement of monopoly power. *The Review of Economic Studies*, *1(3)*, 157–175.

31. Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*, *46(1)*, 31–77.

32. Lončar, D., & Rajić, V. (2012). Concentration and competitiveness of banking market in Serbia: Current situation and possible future changes under the influence of market consolidation. *Ekonomika preduzeća*, *60(7-8)*, 371-384.

33. Mason, E. S. (1939). Price and production policies of large-scale enterprise. *American Economic Review*, *29(1)*, 61–74.

34. Nafisah, M., Abdul Ghafar, I., & Junaina, M. (2015). Evidence on market concentration in Malaysian dual banking system. *Procedia: Social and Behavioral Sciences*, *172*, 169-176.

35. National Bank of Croatia (various years). *Banks bulletin*. Retrieved from http://www.hnb.hr/

36. National Bank of Croatia. *Monetary policy*. Retrieved from http://www.hnb.hr/monet/emonet.htm

37. National Bank of Romania. *Annual report*. Retrieved from http://www.bnr.ro/PublicationDocuments.aspx?icid=6874

38. National Bank of Romania. *Financial stability report* (various years). Retrieved from http://www.bnr.ro/PublicationDocuments.aspx?icid=6877

39. National Bank of Romania. *Interactive database*. Retrieved from http://www.bnr.ro/Interactive-database-1107.aspx

40. National Bank of Serbia (various years). *Banking sector – analyses and reports*. Retrieved from http://www.nbs.rs/internet/cirilica/55/55_4/index.html

41. National Bank of Serbia. *Banking sector of the SRY*. Retrieved from http://www.nbs.rs/export/sites/default/internet/latinica/55/55_4/bankarski_sektor_01.pdf

42. National Bank of Serbia. *The ownership structure and the balance sheet and income statement of banks*. Retrieved from http://www.nbs.rs/internet/cirilica/50/50_5.html

43. Northcott, C. A. (2004). *Competition in banking: A review of the literature* (WP 2004-24). Canada: Bank of Canada.

44. Panzar, J. C, & Rosse, J. N. (1987). Testing for "monopoly" equilibrium. *Journal of Industrial Economics, 35(4)*, 443–456.

45. Raiffeisen research. (2014). *CEE banking sector report*. Retrieved from http://www.rbinternational.com/eBusiness/services/resources/media/829189266947841370-NA-988671613168380133-1-2-EN.pdf

46. Raiffeisen research. (2015). *CEE banking sector report*. Retrieved from http://www.rbinternational.com/eBusiness/services/resources/media/829189266947841370-829189181316930732_829602947997338151-10789457710712239641-1-2-EN-9.pdf

47. Samahiya, M., & Kaakunga, E. (2014). Determinants of commercial banks' interest rate spread in Namibia: An econometric exploration. *Botswana Journal of Economics*, *12(1)*, 1-10.

48. Schumpeter, J. (2013). *Capitalism, socialism and democracy*. United Kingdom: Routledge.

49. Sharma, M., & Bal, H. (2010). Bank market concentration: A case study of India. *International Review of Business Research Paper*, *6(6)*, 95-107.

50. Shin, D. J., & Kim, B. H. S. (2012). Bank consolidation and competitiveness: Empirical evidence from the Korean banking industry. *Journal of Asian Economics*, *24*, 41-50.

51. Smirlock, M. (1985). Evidence on the (non) relationship between concentration and profitability in banking. *Journal of Money, Credit and Banking*, *17(1)*, 69-83.

52. Tushaj, A. (2010). *Market concentration in the banking sector: Evidence from Albania* (WP No. 73). Bamberg: Bamberg University.

53. Weill, L. (2009). Convergence in banking efficiency across European countries. *Journal of International Financial Market. Institutions and Money*, *19(5)*, 818–833.

54. Were, M., Wambua, J. (2014). What factors drive interest rate spread of commercial banks? Empirical evidence from Kenya. *Review of Development Finance*, *4(2)*, 73-82.

55. World Bank data. *Financial sector, interest rate spread*. Retrieved from http://data.worldbank.org/indicator/FR.INR.LNDP

56. EUR-lex. *Access to European Union law*. Retrieved from http://eur-lex.europa.eu/legal-content/SV/TXT/?uri=URISERV:l26073

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