Concentration and Competition in Serbian Banking Sector

Bukvić, Rajko

Nizhny Novgorod State University of Engineering and Economics, Knyaginino, Russia

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CONCENTRATION AND COMPETITION IN SERBIAN BANKING SECTOR

Rajko M. Bukvić

Geographical Institute "Jovan Cvijić" SASA, Belgrade, Serbia
Nizhny Novgorod State University of Engineering and Economics, Knyaginino, Russia
e-mail: r.bukvic@mail.ru

Abstract. *The paper analyzes the degree of concentration and competition in Serbian banking sector on the basis of bank financial statements for year 2016. It uses the traditional concentration indicators (CRn and HH indices), as well as the relatively rarely used Linda indices. The concentration degree is calculated based on five variables: total assets, deposits, capital, bank operating income and loans. It was demonstrated that in the case of the relatively large number of banks in Serbia, the existing concentration degree is low, which provides suitable conditions for the development of healthy competition among them.*

Keywords. *Concentration, competition, banking sector, Serbia, indices Linda, Herfindahl-Hirschman index, concentration ratio*

JEL: C38, G21, L10

1. INTRODUCTION

The last few decades have seen considerable attention being put towards the analysis of development of competition, not only in so called real economy sector but in other branches, as well. Among these other branches, which are infrastructural both on a state level and for the international economy, the banking sector is of particular interest. Its importance has been growing not only in the countries of the former socialist world, which is related with the hugely increased role of market and the consequent deregulation in this and other sectors, but also in developed countries, where deregulation and liberalization processes have also taken place, followed by an integration (mergers and acquisitions) of banks. At the same time, the developed financial markets, especialy the European ones, have become more market-oriented. [Rajan & Zingales, 2003]. In modern economic theory it is assumed that in order to create an efficient market system in all economy segments, especially in the banking sector, it is necessary to provide a competitive environment. Competition in the banking sector is one of the forms of market competition. It appeared lather than competition in industry, but it is characterized by a high intesity and a great diveristy of forms and methods. The main characteristics of the bank competition are described in detail in [Коробова, 2006: 76–100].

After the political changes that took place in 2000, the Serbian banking sector has also undergone some significant changes. The once biggest banks ceased to exist (they were liquidated), some foreign banks entered the market, there were a few acquisitions, etc. At present, there are 30[1] in the market, none of them having a significantly bigger share in the market. For small countries like Serbia, it is a considerable number, and it provides for a development of competition. Foreign banks entering the market and the processes of deregulation and liberalization have naturally created a tougher competition in the banking market. However, there are seemingly no serious and consequent analyses of competition in the market in question. The competition in this sector has not been of particular interest of researchers in the past, although Serbia (Yugoslavia) has had, unlike other socialist countries, considerably developed market relationships, at least in the real sector. Therefore, the most extensive and comprehensive monograph [Begović et al., 2002] does not consider the competition in this sector.

The number of banks and employees in banking sector in the period between 2010 and 2016 is shown on the figure 1. Both the bank and employee figures have decreased substantially in the present decade, by 10% and 20% respectively. However, both figures are still considerable for the relatively small financial market of

[1] Formally, number of banks in Serbia at December 31st 2016 was 31, because Bank of China Srbija a.d. Beograd received work permit December 20th 2016. Of course, data about its business cannot be included in this analysis.

Serbia. Out of the total number of banks, 8 are domestic while 22 are foreign. The domestic – foreign ratio in total assets is 23.3:76.7, and in capital it is 20.6:79.4. The total number of business units (all forms of business network parts: corporate offices, banking subsidiaries, branch offices, counters and other business units) amounts to 1719.

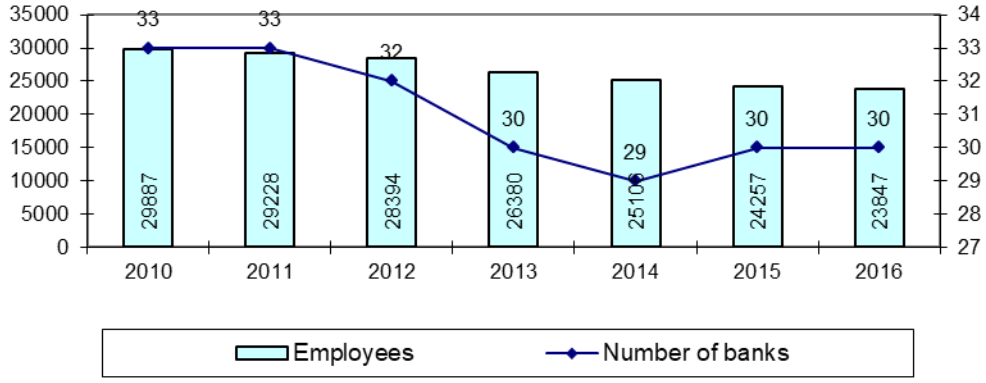

Figure 1. Number of banks and employees in banking sector in Serbia 2010–2016
Source: *Банкарски сектор у Србији. Квартални извештај*. (2010–2016)

2. METHODOLOGICAL EXPLANATIONS

Competition in general and especially in the banking sector, is a complex process difficult to measure, since = there is no generally accepted or best approach to measuring it, nor is there a unit indicator. Therefore, different approaches have been developed in order to measure the degree of competition in a market. They can be divided into direct and indirect approaches. Direct approaches are based on the degree of market power, as the source of addition to the market price. The direct estimation assumes the existence of data about bank service prices and their marginal costs, which is often lacking. In those cases, we use the indirect estimation method, which can be structural and nonstructural. The first one is based on the paradigm "structure – behavior – result" and suggests using the market concentration degree to measure the degree of competition. The nonstructural estimation denies the correlation between concentration and competition, especially in systems with low entry and exit costs (contestable markets, see [Baumol, 1982]). Within this approach many models examine the relationships between banks performances depending on different exogenous factors (models Panzar-Rosse, Boone and others).

Although we don't identify competition with concentration, our approach can formally be considered as structural. As this research is one of the first steps in competition analysis of the banking sector in Serbia is, we will not apply this approach. After all, concentration coefficients also can be used in the nonstructural approach. We can define concentration as it is defined in the OECD Glossary: "Concentration refers to the extent to which a small number of firms or enterprises account for a large proportion of economic activity such as total sales, assets or employment" [Khemani & Shapiro, 1993], without considering different contexts, which are observed by the Glossary.

Before carrying out an appropriate empirical analysis, an issue is to be resolved. It concerns the variables relative to banks and its business that are to be used. While in the case of manufacture and other branches in real economy sector this issue is less or more solved, the situation is different in the banking sector: variables such as volume of production or sales cannot be used. Therefore, other indicators are necessary. They can be, for instance, attracting deposits [Berger & Hannan, 1989], assets and deposits [Berger et al., 1999], assets, loans and deposits [Ljumović et al., 2014], deposits and loans to legal and physical persons [Коцофана и Стажкова, 2011], deposits, loans to legal and physical persons and assets [Ракша, 2010], deposits, loans to legal and physical persons and capital [Lončar & Rajić, 2012], assets, capital, loans, deposits, interest income and net profit (loss) after tax [Miljković et al., 2013]. A review of literature about the use of concentration measures in banking sector until the beginning of 2000s is given in [Bikker & Haaf, 2002b]. Finally, National Bank of Serbia's regular quarterly reports [Банкарски сектор у Србији. Квартални извештај, 2010–2016] give short surveys of concentration and competition in the banking sector, using nine financial balance variables: assets,

loans (total), loans to population, loans to companies, deposits (total), deposits of population, income (total), interest income, income from fees and commissions. As we can notice, the most frequently used variable is total assets, although its use does not exclude other variables. We will also not limit our research to using only variable, therefore we have chosen five indicators: operating income, total assets, capital, deposits and loans. The choice is due not only to theoretical reasons, but also to the sources accessible to the author: bank financial statements available on the website of National Bank of Serbia [Биланс стања/успеха банака, 2017]. In this paper we will analyze the data for the year 2016, but in certain cases we will refer to works pertaining to the previous years.

The second methodological question is the choice of concentration indicators (index). Among the many indicators, see for instance [Martić, 1986], two have been used by researchers and by the practical antimonopoly policy: coefficients of concentration, or concentration ratios CRn (the share of n largest companies in a certain market, where n mostly stood for 4) and HH index (Herfindahl-Hirschman index, or simply Herfindahl index, the sum of the squares of the shares of all participants' in a market). Both indices are based on individual company shares in a market

$$s_i = \frac{Q_i}{Q} \tag{1}$$

where: Qi = volume of company production i, Q = total production volume in an industry branch. Instead of the volume of production, other variables can be used, as it often occurs even in analyses within the real economy sector, for example income or company assets etc. Coefficients CRn are defined as the sum of n greatest shares, as follows:

$$CRn = s_1 + s_2 + \cdots + s_n = \sum_{i=1}^{n} s_i \tag{2}$$

and coefficients (indices) HH as the sum of share squares of all participants in a market:

$$I_{HH} = \sum_{i=1}^{m} (s_i)^2 \tag{3}$$

We will also use these indices. But, unlike the mentioned work [Ljumović et al., 2014], where were used indices CR4 and CR8, we will use also index CR3. We consider, and this has been demonstrated on multiple occasions, that index CR8 is too high for Serbia, and therefore considered insignificant for the purpose of our work.

The advantages and disadvantages of the indicators (2) and (3) in literature are well described, see for example [Буквич, 2015]. We determined in our calculations both of these indicators, although slightly changed. In addition to that, considering their disadvantages, we choose one more index not yet used in Serbian literature, but also rarely used in other countries, especially in the so-called transition economies. One of the examples of its uses [Коцофана и Стажкова, 2011] refers to the banking sector (in Russia). This index (more precisely, the system of indices) is calculated by following general formula, which is developed into a specific formula for every value of m:

$$IL_m = \frac{1}{m(m-1)} \sum_{i=1}^{m-1} \frac{m-i}{i} \cdot \frac{CRi}{CRm - CRi} \tag{4}$$

This index was constructed by the EU Commission consultant Rémo Linda [Linda, 1976]. As well as the index CRn, it is only calculated in case of the few (m) largest enterprises and, therefore, also analyzes the "nucleus" but not the "periphery" of the market in question. However, unlike the concentration ratio CRn, Linda-index (L-index) focuses on the differences in the market "nucleus". In other words, the L-index has to be considered in combination with the concentration-ratio, it measures the "oligopolistic equilibrium" by giving information about the relative shares and their evolution of the top-firms. We have already showed the advantages of the use of Linda-indices in [Буквич, 2013], although this article was primarily illustrative. The calculations of this index are alternate and demanding. Of course, the use of personal computers renders the last note insignificant.

In [Ljumović et al., 2014], [Lončar & Rajić, 2012] and [Miljković et al., 2013] Linda-index was not used, but CRn, HH and others were: reciprocity index, comprehensive concentration index or Horvath-index (CCI), Entropy-index (E-index) and Gini-coefficient. For our purposes, all other indices except the CRn index bear no importance.

3. CONCENTRATION AND COMPETITION IN SERBIAN BANKING SECTOR

Unlike some empirical researches, which divide the banking sector into small, middle and large banks, see for example [Bikker & Haaf, 2002a], we will consider the whole sector as one set. Clearly, it doesn't mean that in a theoretical sense we prefer such approach. The main reason for our choice is obvious enough: regardless of the relatively large number of banks, the banking and financial markets in Serbia are small, by all relevant indicators: total bank assets in December 2016 amounted to 3.241.505 million dinars, while the capital equaled to 632.486 million dinars (by exchange rate of 1 euro = 123,4723 dinars). Therefore, for this work purposes we don't find this division useful by any criteria.

Table 1. Concentration indices in Serbian banking sector in 2016

Criterion	CR3	CR4	CR8	HH
Total assets	39.6	47.4	69.4	813
Deposits and other liabilities	40.1	47.9	69.7	819
Capital	38.7	47.4	73.6	882
Operating income	36.8	44.6	67.9	764
Loans and receivables	36.9	45.3	67.9	763

Source: Based on Financial Statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

The degree of concentration according to traditional indices is shown on table 1. Coefficients CR3 were chosen, which are used in antimonopoly practice in many countries, as well as CR4, which was often used in research works in former Yugoslavia, see [Bukvić, 1999], also in monograph [Begović et al., 2002], and finally CR8. The table shows also Herfindahl-Hirschman indices, since the author had access to the financial statements of all the subjects, which is not always possible in similar analyses.

Table 2. Hirschman-Herfindahl indices for chosen indicators in Serbian banking sector 2010–2016

Balance variable	2010.	2011.	2012.	2013.	2014.	2015.	2016.
Assets	629	660	678	741	794	796	813
Loans (total)	649	722	721	774	771	763	736
to population	687	684	687	714	715	729	728
to companies				788	779	782	768
Deposits (total)	720	714	726	777	818	816	817
from population	796	799	811	866	903	930	939
Income (total)	679	721	916	844	719	734	804
interest income	620	640	678	712	736	734	737
from fees and commissions	739	722	760	828	849	860	879

Source: *Банкарски сектор у Србији. Квартални извештај*. (2010–2016)

In case of both coefficients (CRn and HH), the limits between different market concentration degrees are set arbitrarily. So, USA has been using HH-indices for market classifications since 1982. Before that, the limits had been set on 1,000 and 1,800, and since 2010, they have been 1,500 and 2,500 [Horizontal Merger Guidelines, 1997; Horizontal Merger Guidelines, 2010]. The antimonopoly authority in Russia uses the limits 45% and 70% for CR3, and 1,000 and 2,000 for HH to separate lowly, moderately, and highly concentrated markets [Федеральная антимонопольная служба, 2016]. The values of HH indices for all variants in our

analysis are less than 1,000, so the market should be classified as lowly concentrated. On the other hand, according to the CR3 index, it also belongs to non-concentrated markets, but if were to use the Cr4 index, we would have to classify the market as a moderately concentrated one (except for the third variant, the capital, but in that case, the value of CR4 is practically on the limit between a non-concentrated and a moderately-concentrated market).

The indices of CRn and HH are also used by the National Bank of Serbia in the mentioned reviews of concentration and competition presented in the Bank's quarterly reports. However, due to reasons unknown to the author of this work, they do not use the indices CR3 and CR4, which are justified from the standpoint of small markets and a small number of participant in the market, but they use indices CR5 and CR10 instead, considering share of five, i.e. ten largest banks. We deem that the use of these indices inadequate adequate and will not consider them. Instead, we can consider the results obtained from the report through the use of HH index (see table 2).

All index values in table 2 are less than 1,000, therefore the market should by all indicators be classified as low concentrated. This is constantly emphasized in the reports. However, there is an obvious growth trend in practically all values, with a significant increase in some cases. In this sense, even if we ignore the problem of arbitrary limits between the different market concentration types, there is hardly any room for the satisfactory report estimations that are constantly being repeated («The banking market in Serbia is still characterized by a satisfactory level of competition and a low concentration of activity»). The paper [Miljković et al., 2013], that analyzes the period between 2008 and 2012, demonstrated a growth trend of HH index practically for all observed financial balances variables, with very small exceptions only in certain years and for some variables, so it can be concluded that there is an almost ten years' growth trend of HH indices in the Serbian banking sector.

Clearly, other possible limits between lowly, moderately and highly concentrated markets could result in a different classification. This is one of the main flaws of the CRn and HH index use. Therefore, other approaches to researching concentration and competition are also necessary. One of them are Linda-indices. Unlike the previously mentioned ones, Linda-indices are meant to reveal the existence of oligopoly structures without using any arbitrarily established limits. In contrast, the index values indicate whether oligopoly is present or not in a given market. In the case of a competitive market, the index value decreases ($IL_{m+1} > IL_m$ for all m). If this pattern is broken, it indicates that there is an oligopoly situation in a given market. In our case, only the third variant points out to the existence of oligopoly, which are the Linda-indices calculated on the basis of the capital value (see Table 3). Besides the Linda-indices (V1, V2, V3, V4, and V5, for five values in Table 1), it also shows the column (PE). It represents the so-called perfect equilibrium curve, which is the situation of perfect equality among the participants in a marketplace. The shares of such perfect competitors are the same one to another, and equal to the value 1/n (n = number of participants in market).

Table 3. Linda indices за изабране показатеље у банковном сектору Србије у 2016.

IL	V1	V2	V3	V4	V5	PE
						1
IL2	0.6892	0.6317	0.9668	0.7618	0.6980	0.5
IL3	0.4897	0.4750	0.6234	0.5078	0.4815	0.333
IL4	0.4154	0.4132	0.4398	0.4058	0.3787	0.25
IL5	0.3459	0.3493	0.3405	0.3237	0.3212	0.2
IL6	0.3174	0.3323	0.2822	0.2943	0.3019	0.167
IL7	0.2993	0.3025	0.2540	0.2717	0.2758	0.143
IL8	0.2749	0.2708	0.2665	0.2523	0.2514	0.125
IL9	0.2535	0.25098	0.2662	0.2309	0.2392	0.111
IL10	0.2121	0.20947	0.2272	0.1954	0.2004	0.1

Source: Обрачун на основу Financial Statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

The third variant (variable V3, i.e. capital) indicates oligopoly (IL8>IL7): the sequence of indices ILi is not monotonically decreasing function. However, the observed variable (capital), as residual of assets and liabilities, is the "worst quality" variable among the chosen ones. Therefore, having taken into consideration the

other results from Table 3, it could be said with great certainty that the results obtained by coefficients CR3, CR4 and HH were confirmed, i.e. that the Serbian banking sector in 2016 is lowly concentrated. And this is the good foundation for competition development.

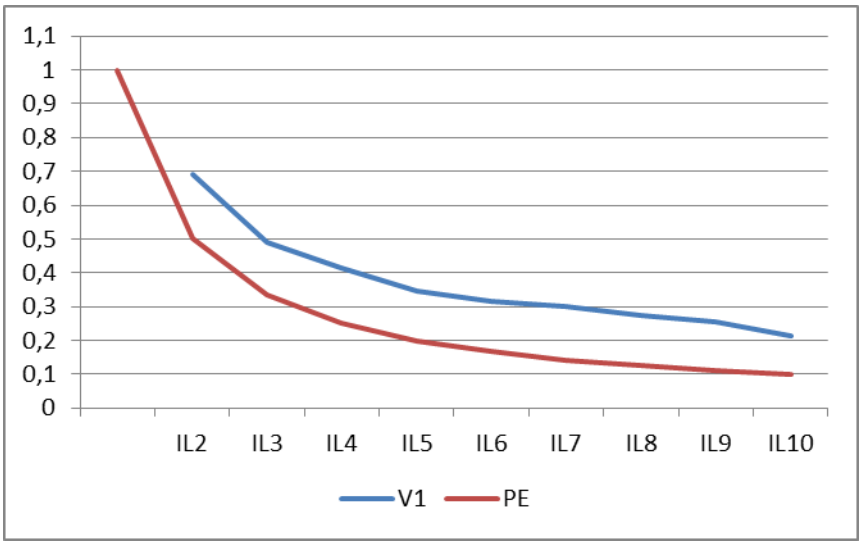

Figure 2. Linda indices for assets and "perfect equilibrium" curve for banking sector, Serbia 2016
Source: On the base of Financial Statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

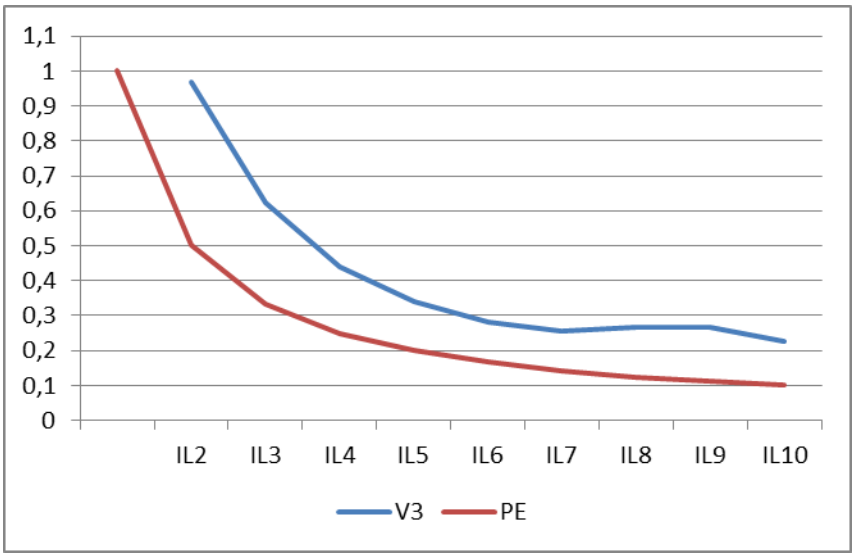

Figure 3. Linda indices for capital and "perfect equilibrium" curve for banking sector, Serbia 2016
Source: On the base of Financial Statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

The graphical representation of Linda-index is also of great interest (see Figures 2 and 3). It shows indices for assets (Figure 2), as the most widely-used balance variable for the purposes of such analyses of concentration and competition in the banking sector. It also shows indices for capital (Figure 3), where, as shown in Table 3, there is a suspicion of oligopolistic structures. Unlike the indices CRn, which are a monotonically increasing function as each next participant is added (CR1<CR2<…<CRn), Linda indices form a broken curve (Figures 2 and 3). The area between IL and PE is named "oligopolistic arena" and it even visually shows the difference between the real situation and an ideal, perfect competition.

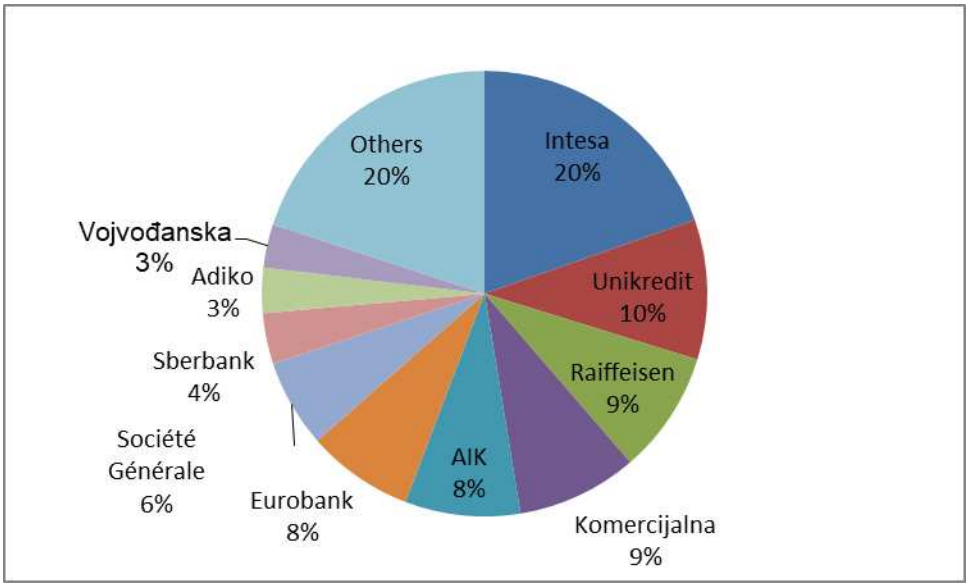

Figure 4. The shares of leading banks in total banking sector capital
Source: On the base of Financial Statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

The bank shares in the total banking sector capital are shown on Figure 4. They suggest, that the first seven banks form an oligopolistic structure – the seventh one in range (Société Générale) is greater by over 70% in terms of capital than the next, eighth one (Sberbank) (the shares are 6.4 : 3.7). If so, of course, this could be a case of so-called loose oligopoly, in which, by theoretical propositions, 6–7 firms participate in a market with a 70–80% share. In our case, this share for the first seven firms is 69.9%. Therefore, such a conclusion can be drawn. The state of the banking market must be permanently observed, because the values of coefficients HH, even CR4 are close to being moderately concentrated. As shown previously, the National Bank of Serbia does so, although through the use of simple instruments.

4. CONCLUSION

Banking market in Serbia is characterized by a relatively large number of banks (30). Among them there are no prominently large banks. According to all the chosen indicators (operating income, total assets, deposits and capital), the greatest share is held by the Intesa Bank (16.4; 19.6; 16.6; 17.0 and 15.8%, respectively). The concentration indices (CR3, CR4, HH and Linda indices IL) indicate a low concentration degree, although close to being moderately concentrated, but also an absence of oligopoly, with the mentioned exception. Even though this does not assume the existence of true competition, these results point out to good perspectives for creation and development of competition. In fact, we could consider that our results confirm the results obtained by [Lončar & Rajić, 2012] and [Miljković et al., 2013], which referred to three quarters of 2012, as well as those of [Ljumović et al., 2014], for the period between 2003 and 2012. However, we should take account of slight growth in concentration. It is difficult to compare the results of these works due to the differing approaches that were used, although the application of the HH index is a solid foundation for comparison in such cases.

As banking competition is very complex, this paper should be considered as one of the first analyses of concentration and competition in banking, and in the Serbian financial market in general. We hope that it will be a research subject of other researchers. New approaches would, naturally, be desirable in such future researches.

In addition to the fact that the concentration degree is not high despite its increase, more attention should be put towards the actions of banks in the market, which falls under the scope of regulation and control. In particular, the issues of collusion and deals between banks should be dealt with, although they have not been considered in this paper.

5. ACKNOWLEDGMENT

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