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MEASURING OF CONCENTRATION AND COMPETITION: SERBIAN BANKING SECTOR

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SUMMARY: The author in this paper considers the question of the use of indices of concentration and competition in the banking market. As example he chose the Serbian banking sector during the second half of the 2010s. The analyses are based on the data of bank financial statements for relevant years, as well as the results of other researchers. The traditional concentration indicators (CRn and HH indices) are used, as well as the Gini coefficients and Rosenbluth and Tideman-Hall index and coefficient of entropy. At the end author calculated Linda Indices, the rarely used indicators not only in Serbia, and new Svetunkov's approach and coefficients of the model based on Gauss exponential curve. The concentration degree in all cases is calculated based on five variables: total assets, deposits, capital, bank operating income and loans. Although these variables are highly correlated, the results show relatively important differences of its use. In the case of such variable as capital, the Linda indices suggested the existence of an oligopoly structure. In conclusion, it was demonstrated that in the case of the relatively large number of banks in Serbia, the existing concentration degree is generally moderately low, which provides suitable conditions for the development of healthy competition among them. At the end, there is necessary to emphasize different capability of information respective indicators and its different discriminative power. In future research this is fact that is it undoubtedly necessary particularly not to ignore.

KEY WORDS: concentration, competition, banking sector, SCP paradigm, Serbia, Linda indices, Gini coefficient, Herfindahl-Hirschman index, Rosenbluth index, Tideman-Hall index, entropy index, concentration ratio, oligopoly

JEL: C38, G21, L10

In modern economic theory as well in economic policies of many countries competition is one of the most popular and most frequently used terms. The end of 20th and beginning of 21st century often are denoted as the competition epoch of global importance. Modern economic thought is united in believing that a competition is a factor that provides the efficiency of market economy. The concept of competition is universal model that is used not only in economics, but also in sociology, anthropology, theory of games and other sciences and scholarly disciplines. But, despite two and half century tradition (Adam Smith is considered as a founder of the theory of competition), theoretic thought not yet succeed to build one undisputed, universally accepted, definition of competition: many aspects, phenomena and facts linked to competition stil challenge the researchers. One of such questions is how to measure the competition, which can be considered as one of the central question of the whole theory; it is also important when it comes to the practical use of results of the theory (say, in conducting of antimonopoly, i.e. competition policy).

The last few decades have seen considerable attention being paid to the analysis of development of market competition and affirmation of market principles. This coincided with the collapse of planned economies and the beginning of their transformation into market economies. In emerging market economies, one of the most important problems was the building of a new, market-oriented financial system, with a new role of the financial and banking institutions. As a result, the question of the evolution of the financial system, still remaining outside the mainstream neo-classical modeling, has come to the top of research work [Rybczynski 1997]. Consequently, considerations of the conditions for building the market circumstances are characteristics not only in the so-called real

economy sector but in other branches, as well. Among these other branches, which are infrastructural both at the state level and at the international economic level, 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 to the hugely increasing role of the 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, especially European ones, have become more market-oriented [Rajan and Zingales 2003].

Modern economic theory assumes that in order to create an efficient market system in all segments of the economy, especially in the banking sector, it is necessary to provide a competitive environment. It is argued that the potential benefits of competition in banking are similar to its benefits for other industries, such as: it can improve allocative, productive, and dynamic efficiencies (e.g. by promoting innovation), with the ultimate benefit being stronger economic growth [Northcott 2004]. These problems were the subject of many research, some of them are demonstrated in Table 1.

Table 1. Positive and negative effects of bank competition

Author(s)	Year	Effects of bank competition: Conclusions
Petersen M. and Rajan R.	1995	In highly concentrated markets, small-business loans are more accessible, and in addition to that, new companies can take out loans with lower interest rates.
Jayaratne J. and Strahan P.	1996	Salaries and production grow faster after new bank branches can open unrestrained, therefore we can conclude that banking competition has a positive effect on the economic growth.
Shaffer S.	1998	Household income grows faster in areas with a larger number of banks.
Black S. and Strahan P.*	2000	The number of new companies and business associations is smaller in areas with higher market concentration.
Collender R. and Shaffer S.	2000	While the effect of market concentration on household income between 1973 and 1984 was negative, it became positive between 1984 and 1996.
Bonaccorsi D. and Dell' Ariccia G.*	2000	The start-up scene is more active in the markets with a concentrated banking sector.
Dell'Ariccia G.**	2000	Concentration in banking sector has negative effects on economic growth.
Cetorelli N.	2004	Sectors in which old companies ask more finances they are disproportionally big sized, if they are in countries where banking sector is more concentrated.
Deidda L. and Fattouh B.	2005	Banking concentration exerts two opposite effects on growth: it induces economies of specialization, which is beneficial to growth, and it results in duplication of banks' investment in fixed capital, which is detrimental to growth.
Bergantino A. and Capozza C.	2012	Bank concentration promotes entrepreneurship; however, an excessive level of concentration becomes harmful. The positive effect of concentration decreases for high-technology-intensive sectors.

* Mimeo, in: [Моисеев 2008]; ** Mimeo, in: [Cetorelli 2004].
Source: [Моисеев 2008], [Cetorelli 2004], adaptations and additions made by author.

Competition in the banking sector is one of the forms of market competition. It appeared later than competition in industry, but it is characterized by a high intensity and a great diversity of forms and methods. The main characteristics of banking competition are described in detail in [Коробова 2006: 76–100]. Shortly, we can say that the perfect competitive environment in the banking sector has the three main characteristics: (1) there are a large number of banks in the market; (2) banks offer a homogenous product with regards to the cost and attribute of the product; (3) the cost for new banks to enter the market is very low [Tan 2016: 56].

SOME REMARKS ON THE DEVELOPMENT OF THE MODERN BANKING SECTOR IN SERBIA

Building a market economy and the affirmation of the market principles of doing business are among the main tasks in all countries undergoing transition. In parallel with the efforts of the legislative authorities and bearers of economic policy, these tasks are also reflected in theoretical and practical interests at the academic level, where a growing number of papers in various types of scientific publications tackle the appropriate problems. Although the problems of building market relations have not been unknown in Serbia, i.e. Yugoslavia, since the 1950s – unlike in other so-called socialist countries – the country still, due to a combination of certain circumstances launched the process of transition practically much later than aforementioned countries. Regardless of certain, not minor controversies regarding the nature of socialist market relations at the time, the multi-decadal experience of their existence and activity was not adequately assessed and evaluated, while current titles did not even use it. Instead, the approach of not speaking about the subject was accepted, also seen in the official documents of the highest international organizations[1], or complete disdain. How much that approach contributed to the results achieved is a question that is probably still too early to expect an answer to, but it is also a question that is beyond the subject of research in this paper. It merely serves as grounds for noting that Serbia entered into the transition process without acknowledging and evaluating its previous experience.

The aforementioned statement was certainly relevant to and reflected on the reforming and development of the banking system. Although they had until then been treated as a "service for the economy," with strong interference of the political establishment, banks, like the rest of the economy, were familiar with the market principles of doing business and had partly been exposed to them. But not even this was the point at which past experience was evaluated. After the political changes that took place in 2000, the Serbian banking sector also underwent some great and significant changes. At the begin of 2001 86 banks operated in the territory of Serbia, but that same year 23 banks were stripped of their operating licenses, which, along with some other changes, reduced the number of banks to 49 at the end of the year [Bankarski sektor SRJ 31.12.2001, 2000: 1–2]. Right at the start of 2002, bankruptcy proceedings were initiated in four large banks (Beobanka AD Beograd, Beogradska banka AD Beograd, Investbanka AD Beograd and Jugobanka AD Beograd), which, combined, accounted for more than 57% of the balance sheet total.

[1] So, the World Bank does not even mention the Yugoslav experience in its *World Development Report 1996*.

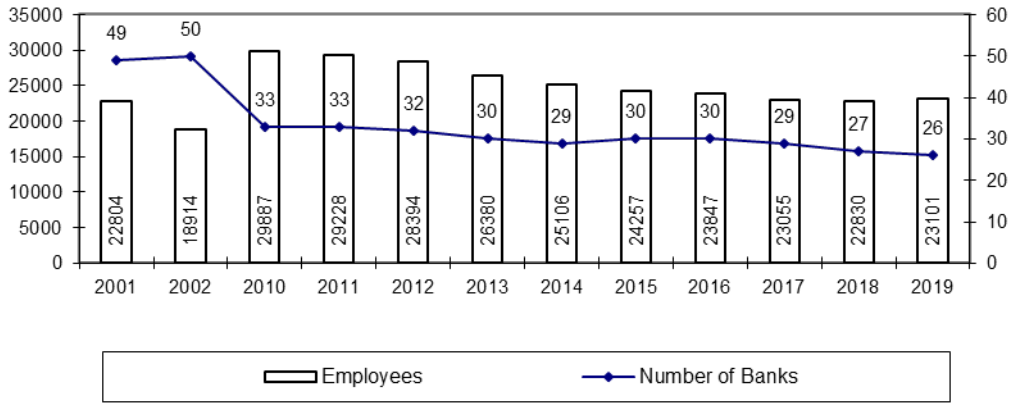

Figure 1.Number of banks and employees in the Serbian banking sector 2001–2019
Source: Bankarski sektor 2002, Banking Sector in Serbia. Quarterly Report. (2010–2019)

The changes continued in the next years: the once biggest banks ceased to exist (they were liquidated), some foreign banks entered the market, there were a few acquisitions etc. On the whole, there is a noticeable trend of decline in the number of banks, which mainly happened through merger and consolidation processes, and only in exceptional cases through the revoking of an operating license by the National Bank of Serbia[2]. The process of foreign capital penetration into the banking sector unfolded simultaneously with those changes, incited precisely in 2001, when the National Bank of Yugoslavia granted operating licenses to five foreign banks: Micro finance bank AD Beograd, Raiffeisenbank Yugoslavia AD Beograd, Alpha bank AE (Belgrade affiliation), HVB bank Yugoslavia AD Belgrade and the National bank of Greece (Belgrade branch). At the end of 2019, there were 26 banks in the market, none of them having a particularly large market share. For small countries like Serbia, it is a considerable number, and it provides for the development of competition. Foreign banks entering the market and the processes of deregulation and liberalization have naturally created a tougher competition on 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 to researchers in the past, although Serbia (Yugoslavia) 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 the banking sector in the period between 2001 and 2019 is shown in Figure 1. Both the bank and employee figures have decreased substantially in the present decade, by more than 10% and 20% respectively. However, both figures are still considerable for Serbia's relatively small financial market. According to the Quarterly Report for the 4th quarter of 2019, out of the total number of banks, 7 are domestic while 19 are foreign. The domestic–foreign ratio in total assets is 24.3:75.7, and in capital it is 25.6:74.4. The total number of business units (all forms of business network parts: corporate offices, subsidiary banks, branch offices, counters and other business

[2] Besides the case of the four aforementioned banks, which were stripped of their operating licenses in 2002, Marinković lists three such cases from the first half of the first decade: Raj banka Beograd, Kreditno-eksportna banka Beograd and MB banka Niš. [Marinković 2007: 284].

units) amounts to 1,598 in 2019. The total number of business units has also decreased in previous years. It amounted to 1,719 at the end of 2016, 1,627 at the end of 2017, and 1,598 at the end of 2018.

SOME METHODOLOGICAL CONSIDERATIONS

Competition in general and especially in the banking sector, is a complex process difficult to measure, since there is no generally accepted or optimal approach to measuring it, nor is there a single indicator. In the lack of satisfactory answer to question what is the competition and how to measure it, oftens the relative estimates on nonquantitative scale are used – strong competition, moderate competition, weak competition and so on. As a basis for such type of estimation the expert assesments are used, as well as sociological questionnaires, or the results, i.e. aftermaths of competition. Principally, the researchers can access different indicators, that are used for the achieving such estimates, including the data about prices and costs. But, the key, internal data in most cases are not accessible. Therefore the researchers must be satisfied with the data about the results of the competition struggle in the market, i.e. its aftermaths. As such results appeare the number of firms in market, its incomes and profits, i.e. assets and capital, and on the basis of that the shares of participants in market in observable variables, that are achieved just in the competition process. Of course, this is usable also for the profit rate in any branch.

These determine two basic approaches, which have been developed in order to measure the degree of competition in a market: direct and indirect approaches. Direct approaches are based on the degree of market power, as a source of addition to the market price. The direct estimation assumes the existence of data on bank service prices and their marginal costs, which is often lacking. In those cases, the indirect estimation method is used.

The method of indirect estimation is one of the most often used approaches in estimating the competition degree in the market. It begins just from the realized shares of market participants, and estimates the competition on the basis of distribution of these shares between the participants in the market. The logic in this approach is simple: as well the concentration is lesser, so the participants in the market have lesser market power, and so the possibility for the development of competition is bigger. It can be represented by simple model

$$L=1-C \qquad (1)$$

that shows inverse relation between competition (L) and concentration (C), where this relation is assumed as linear. This assumption is extremly simplified, and basically not correct, because the researches are shown, that this relation is different. But, it is yet necessary to accept this assumption, because the nature of this relation is not explained [Воробьёв and Светуньков 2016].

The indirect method of estimation can be structural and nonstructural. The structural approach is based on the paradigm “structure–behavior–result” and suggests using the market concentration degree to measure the degree of competition. The structure–conduct–performance (SCP) paradigm, also known as the Bain/Mason paradigm or concept, has been a very popular model in industrial economics since the Second World War. It is largely empirical, i.e. it relies on empirical data

but for the most part, lacks a theoretical base[3]. Of course, the SCP was not originally developed for banks. But, applied to this sector, the SCP paradigm means that a change in the market structure or concentration of banking firms affects the way banks behave and perform:

Structure → Conduct (higher prices) → Performance (higher profits) (2)

where it is assumed that a concentrated market allows firms to set prices (e.g. relatively low deposit rates, high loan rates) which boost profitability, i.e. the bank profit rate.

Contrary to this approach, the Relative Efficiency Hypothesis (RE) assumes that some firms are enormously profitable because they are more efficient than others. In other words, efficiency is exogenously determined, i.e. the hypothesis postulates that market concentration is a result of firms' superior efficiency, which leads to larger market share and profitability. The hypothesis states that the causality goes from greater efficiency, lower prices and higher concentration/market share:

Efficiency→Conduct (Higher Output and/or Lower Prices)→Market Share→Performance (Higher Profits) (3)

and can be linked to the X-efficiency (hypothesis): some firms have superior management or production technology, which makes them relatively more X-efficient with lower costs. Several authors have tested this hypothesis in various studies of the banking industry, but results are generally mixed, see for example [Evanoff and Fortier 1988].

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 of Panzar-Rosse, Boone and others).

Although we don't identify competition with concentration, our approach can formally be considered as structural. Forasmuch this research is one of the first steps in competition analysis of the banking sector in Serbia, we will not apply this approach in ordinary sense. After all, concentration coefficients can also 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 and Shapiro 1993], without considering different contexts, which are observed by the Glossary.

Choice of the variables

Before carrying out an appropriate empirical analysis, some issues are to be resolved. The first of them pertains to the variables relative to banks and their business that are to be used. While in the case of manufacture and other branches in the 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 and were used. They can be, for instance, attracting

[3] For the theoretical background of the SCP paradigm, see for example: [Hannan 1991].

deposits [Berger and Hannan 1989], assets [Маринковић 2007] assets and deposits [Berger et al. 1999], assets, loans and deposits [Vuković 2006] and [Ljumović et al. 2014], total assets, net interest income and capital [Eraković 2017], 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 and Rajić 2012], assets, capital, loans, deposits, interest income and net profit (loss) after tax [Miljković et al. 2013][4]. Finally, the National Bank of Serbia's regular quarterly reports [Банкарски сектор у Србији. Квартални извештај, 2010–2020] provides short surveys of concentration and competition in the banking sector, using nine financial balance variables: assets, loans (total), loans to the population, loans to companies, deposits (total), deposits of the 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 one variable, therefore we have chosen five indicators: total assets (X1), deposits (X2), capital (X3), operating income (X4) and loans (X5). In our previous articles we used all five these variables, or three of them, e.g. [Буквић 2020]. Our choices are due not only to theoretical reasons, but also to the sources accessible to the author: bank financial statements available on the website of the National Bank of Serbia [Биланс стања/успеха банака, 2020]. In this paper we will analyze the data from the balances of Serbian banks during the period of second half of 2010s for all five aforementioned variables.

Although the problem of the choice of variables can be seem of great importance, the data we analyzed in previous articles listed in literature suggest that this is not so. The correlations between the selected indicators (see Table 2) are very high, and the differences practically negligible. The coefficients between capital and other variables are the smallest, which can be explained by the nature of capital as the residual variable, as we will see further on. Of course, these coefficients are also very high. But, as we shown in [Буквић 2020] such conclusion is not absolutely correct, the correlation coefficients are not enough for explanation of these complex question.

Table 2. Correlation coefficients for the selected variables X1-X5 in 2016, 2018 and I-IX 2020

	2016				2018				2020			
	X2	X3	X4	X5	X2	X3	X4	X5	X2	X3	X4	X5
X1	0,9975	0,9548	0,9923	0,9807	0.9979	0.9516	0.9894	0.9652	0.9988	0.9636	0.9847	0.9759
X2		0,9327	0,9910	0,9720		0.9315	0.9856	0.9551		0.9497	0.9825	0.9719
X3			0,9432	0,9549			0.9470	0.9437			0.9577	0.9472
X4				0,9719				0.9679				0.9610

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

Choice of the concentration indicators

The second methodological question is the choice of concentration indicators (indices). Among the many indicators, see for instance [Curry and George 1983] for standard used measures and [Martić 1986] for many indicators, two have been most often used by researchers and by the practical anti-

[4] A review of literature about the use of concentration measures in the banking sector until the beginning of the 2000s is given in [Bikker and Haaf 2002b].

monopoly 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 the HH Index (Herfindahl-Hirschman Index, or simply Herfindahl Index[5], 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

$$s_i = \frac{q_i}{Q} \tag{4}$$

where: Qi = volume of company production, Q = total production volume in an industry branch. Of course, the share (4) can be expressed as percent. 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. The oldest and most commonly used of all indices is the CR-firm concentration ratio, defined as the cumulative share of the n greatest shares, as follows:

$$CRn = s_1 + s_2 + \cdots + s_n = \sum_{i=1}^{n} s_i \,. \tag{5}$$

CRn is extremely simple to be calculated, but the choice of n is arbitrary, and n very vary in different studies. It focuses on the "nucleus" of the market, and "periphery" for them is not of interest[6].

The HH coefficient (index) is defined as the sum of share squares of all participants in a market:

$$I_{HH} = \sum_{i=1}^{m} (s_i)^2 \,. \tag{6}$$

We can note, that Hirschman-Herfindahl index can be expressed as

$$I_{HH} = n\sigma^2 + \frac{1}{n} \tag{7}$$

where σ^2 is dispersion of market shares s_i. Therefore it is clear to see, that in the case of perfect competition this index has (minimal) value equal to 1/n, also the number of participant in market determines the range of the values of coefficients [1/n, 1]. On the other side, from (7) allows that myriad of combinations σ^2 and n exists, which can result to same value of coefficient, and these makes its applicability very questionable. But, despite of that, it is used in practice of antimonopoly authorities, even in developed countries.

We will also use these indices. But, unlike the aforementioned work [Ljumović et al. 2014], where the indices CR4 and CR8 were used, we will use both these indices and also the CR3 index. We consider, and this has been demonstrated on multiple occasions, that the CR8 index is too high for Serbia and therefore insignificant for the purpose of our work. All the more so that it can be said for the coefficient CR10, which uses National Bank of Serbia, together with CR5.

The advantages and disadvantages of the indicators (5) and (6) are described in the relevant literature, see for example [Буквич 2015]. Therefore, for the more precisely and comprehensive

[5] We ignore the disputed problem of the 'paternity' of this index.
[6] The terms "nucleus" and "periphery" of the market were used in the usual sense, not strictly considered, as in the works of Motokhin and Smaragdov, see for example [Смарагдов et al. 2015].

analyses it is necessary to use other indicators. Besides the aforementioned indices, we will also use the Gini coefficient, another frequently used method of assessing the degree of concentration. Out of the multiple ways to determine this coefficient, we have chosen the following one [Lipczynski et al. 2017: 278]:

$$G = \frac{\sum_{n=1}^{N} \sum_{i=1}^{n} s_i}{0.5(1+N) \sum_{i=1}^{N} s_i} - 1 \qquad (8)$$

where s_i denotes shares (4), while N is the number of observed units (in our case – banks). This procedure is the inverse of the usual presentation (and calculation) of the Lorenz curve and the Gini coefficient, as it arranges the appropriate line into a descending one, thus the resulting graphical image is doubly symmetric relative to the regular Lorenz curve – diagonal from (0.0) to (1.1) and vertical.

Like a Hirschman-Herfindahl coefficient, Gini coefficient is characterized with variability of results, i.e. there are different configurations of market shares that as result can produce same value of coefficient. On the other side, the degree of competition, i.e. the limits between different market statuses, is here also arbitrary. So, by some opinions, values of coefficient bellow the interval of 0.6–0.4 characterize high competitive markets, although there are the others that consider it as not based upon and correct, see for example [Смарагдов и Сидорейко 2015].

We note that Hirschman-Herfindahl coefficient (6) sum the squares of market shares, what in fact means that market shares are pondered with its values. It is clear that this gives greater significance to greater shares, i.e. to stronger market participants. This is sometime emphasized as a lack of this indicator. But, more important is that index HH not provide unique relation between the distribution of shares and degree of concentration, so it can have same value for very different configuration of market shares [Смарагдов и Сидорейко 2015]. Therefore it was many attempts to make diverse weights in summing of market shares. Among them Rosenbluth and Tideman-Hall indices stand forward. Rosenbluths coefficient summing all market shares (arranged to descending order), but ponder it with appropriate ranks, while coefficient is calculated by the formula [Bikker and Haaf 2002]:

$$R = \frac{1}{2 \times \sum_{i=1}^{N} R_i s_i - 1}. \qquad (9)$$

At the same manner Tideman-Hall coefficient is constructed [Hall and Tideman 1967]

$$TH = \frac{1}{2 \times \sum_{i=1}^{N} R_i s_i - 1}, \qquad (10)$$

but the shares are here arranged to ascending order.

Also, the coefficients (9) and (10) differ from HH coefficient through the weights of market shares of market participants. While the last, as well were emphasized, ponder in fact the shares with its own shares, in coefficients (9) and (10) weights are the ranks of these shares in their arranged group, in one case into descending and in other case in ascending order.

One of, in our circumstances, rather used measure of concentration is coefficient of entropy. It is defined as [Lipczynski et al. 2017]

$$CE = \sum_{i=1}^{N} s_i \, ln\left(\frac{1}{s_i}\right), \tag{11}$$

and it is in fact inverse coefficient: coefficient (11) has so lesser values as the concentration is bigger. Minimal value CE=0 coefficient achieves in case of perfect monopoly, and maximal value in case where all firms have same market shares ($s_i=s_j$, $i,j \in <1,2,\ldots,N>$), but this maximal value is not unit and amount ln(N). This situation makes coefficient of entropy not appropriate to the need of comparison of sets with different size, therefore appeared the need for standardization of coefficient (11). For these purposes it is necessary to divide the expression (11) with ln(N), so we get the coefficient of relative entropy

$$CRE = \frac{1}{ln(N)} \sum_{i=1}^{N} s_i \, ln\left(\frac{1}{s_i}\right), \tag{12}$$

so the values of them are in interval [0,1].

The other coefficients of this type (coefficient of variation, Horvath's, Hanna-Key, Davis' and others) are used significantly rather, and we will not here they consider.

We included both of these indicators (5) and (6) in our calculations, also the Gini coefficient (8) and Rosenbluth and Tideman-Hall indices (9) and (10), as well as the coefficients of entropy (11) and (12). In addition to that, considering their disadvantages, we chose one more index used in Serbian literature only in our works, 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 just to the banking sector in Russia. This index (more precisely, the system of indices) is calculated by following a general formula, which is developed into a specific formula for every value of m:

$$IL_m = \frac{1}{m(m-1)} \sum_{i=1}^{m-1} \frac{m-i}{i} \cdot \frac{CRi}{CRm-CRi} \tag{13}$$

This index was constructed by EU Commission consultant Rémo Linda [Linda 1976]. As well as the CRn index, 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 CRn concentration ratio, the 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 top firms' relative shares and their evolution. If the obtained series of indices (13) is monotonically descending, oligopolistic structure not exists, but for its existence, in contrary, indicates the first violation of descending series: ILm<ILm+1. Because the oligopolies, by the definition, is forming by three to four ("tight"), i.e. seven to eight firms ("loose"), Linda indices are calculated approximately to the tenth firm. At this manner, this indicator considers "nucleus" of the market, but difference in relation to CRn is very obvious. We have already shown 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.

The distribution of the market shares of the participants was also considered by author and his co-author [Bukvić and Hinić 1995] in the analysis of commodity markets in FR Yugoslavia. To the distribution of indicators CRi (i=1, 2, 4, 6), which were calculated on the basis of enterprises' incomes, for 185 branches of commodity markets, authors identified 11 market types (from monopoly to competition) by the use of cluster analysis. This approach repeated author in purposes to establishing of types of market structures in Yugoslav food industry for the year 2000 [Буквић 2002], for all 218 product, on whole set of indicators CRi (i=1, ... 6), which were calculated on the basis of physical quantum of production. In both cases for discrimination of market statuses the Euclidean distance is used, as most famous metrics in cluster analysis:

$$d_{ij} = \sqrt{\sum_{l=1}^{218}\left(s_i^l - s_j^l\right)^2}. \tag{14}$$

Distribution of market shares is initial basis also in other approaches. One of them was used in the works of S. G. Svetunkov, see for example [Воробьёв и Светуньков 2016]. There new approach was demonstrated, which is based on the fact that (arranged) set of firms' shares in market (4) forms monotonically descending function (Figure 2). This function can be presented with exponential curve of the Gauss type (15), with two unknown parameters (*a* and *b*), which can be estimated by the least square method, directly, or after previous logarithm transformation, that as result gives linear function.

$$s_i = be^{-a(i-1)} \tag{15}$$

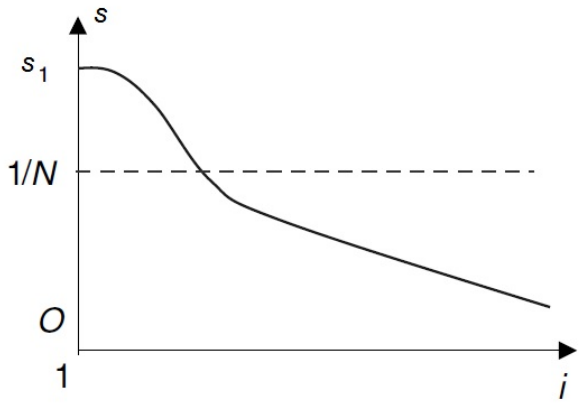

Figure 2. Distribution of firms' market shares

Denote, but, that for i=1 in (15) it follows that $b=s_1$, and by this replacement it is to get the function with one parameter (16), which by logarithm transformation results in (17), wherefrom parameter *a* can be easily estimated, follow to (18).

$$s_i = s_1 e^{-a(i-1)} \tag{16}$$

$$ln\frac{s_i}{s_1} = -a(i-1)\,. \tag{17}$$

$$a = -\frac{\sum_{i=1}^{N} ln\frac{s_i}{s_1}}{\sum_{i=1}^{N}(i-1)} \tag{18}$$

Coefficients b=s_1 and a represent, i.e. demonstrate properties of observed distribution of companies' shares in market, so they are in fact special coefficients of concentration, what is simply clear for parameter b without any consideration.

M. Kostić provided a review of the concentration index in his dissertation [Костић 2013], including indices (4)–(10), but his analyses do not pertain to the banking sector, he focused to the cooking oil and beer markets. In all other aforementioned works, excluding [Коцофана и Стажкова 2011] and myself, the 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 the Gini coefficient. For our purposes, all other indices except the CRn index bear no importance. The Rosenbluth and Tideman-Hall indices, as well the new Svetunkov's approach [Воробьёв and Светуньков 2016] was used in [Буквић 2020], but the goal of this article was other, the comparison of the concentration indices.

CONCENTRATION AND COMPETITION IN THE SERBIAN BANKING SECTOR: ANALYSIS OF CONCENTRATION INDICES

Unlike some empirical research, which divides the banking sector into small, middle and large banks, see for example [Bikker and Haaf 2002a], we will consider the whole sector as one set. Clearly, it doesn't mean that in a theoretical sense we prefer that 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 (see Table 3). As we can see, the exchange rate of the euro in this period decreased for circa 5%, so the growth of the chosen amounts presented in euro was some lower. Therefore, for the purposes of this work, we don't find this division useful by any criteria.

Table 3. Total assets and capital of the Serbian banks in 2016 – 30 IX 2020

Average exchange rate of the euro	31. XII. 2016	31. XII 2018	30. IX 2020	Index 2020/2016
	123.4723	118.1946	117.5803	95,2
Total assets (dinars)	3,241,504,719	3,774,055,499	4,509,836,905	139,1
Capital (dinars)	632,486,285	676,704,699	716,956,940	113,4
Total assets (euros)	26,252,890.070	31,930,862.315	38,355,378.450	146,1
Capital (euros)	5,122,495.369	5,725,343.620	6,097,594.070	119,0

Source: Calculated on the base of Financial Statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

This paper can be considered as a continuation of our research of the concentration and market structures in the modern Serbian banking sector. In previous works we analyzed the status in this sector in 2016 [Bukvić 2017], in 2017 [Bukvić 2019], and in 2018 [Bukvić 2020]. In these works the Linda indices were used into addition to standard coefficients (5) and (6), and lesser the other here

mentioned indices of concentration. The recent our work is not only renewed with data and an analysis for next years. We have made some new calculations by using indicators that were not used and some other considerations that enable better observation of the bank concentration by the variables used.

Table 4. Standard concentration indices in the Serbian banking sector, 2016 to I-IX 2020

Criterion	Year	Total assets	Deposits	Capital	Operating income	Loans
CR3	2016	39,6	40,1	38,7	36,8	36,9
	2017	38,5	38,8	37,7	34,8	37,5
	2018	37,4	37,6	37,2	37,0	37,3
	2019	37,4	37,6	37,1	36,0	36,1
	I-IX 2020	36,8	36,9	37,0	34,1	36,6
CR4	2016	47,4	47,9	47,4	44,6	45,3
	2017	47,0	47,7	46,9	43,4	46,2
	2018	45,8	45,9	45,8	46,2	45,1
	2019	45,6	45,9	45,3	44,7	44,0
	I-IX 2020	45,0	45,1	45,9	42,2	44,2
CR8	2016	69,4	69,7	73,6	67,9	67,9
	2017	70,6	71,0	73,3	69,0	70,2
	2018	70,1	70,9	72,3	70,2	69,0
	2019	70,1	71,0	72,5	70,3	68,4
	I-IX 2020	70,7	71,7	72,6	70,3	69,1
HH	2016	813	819	882	764	763
	2017	813	818	848	762	787
	2018	779	786	807	805	771
	2019	800	814	799	791	781
	I-IX 2020	792	801	804	768	783

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 in Table 4. The CR3 coefficients were chosen, which are used in anti-monopoly practice in many countries, as well as CR4, which was often used in research works in the former Yugoslavia, see [Bukvić 1999], also in the monograph [Begović et al. 2002], and finally CR8[7]. The table also shows the Herfindahl-Hirschman indices, since the author had access to the financial statements of all the subjects, which is not always possible in similar analyses.

The CRn and HH indices are also used by the National Bank of Serbia in the aforementioned reviews of concentration and competition presented in the Bank's quarterly reports, earlier in Economic Overview. However, due to reasons unknown to the author of this work, they do not use the CR3 and CR4 indices, which are justified from the standpoint of small markets and a small number of participants in the market, but they use the CR5 and CR10 indices instead, considering the share of

[7] The National Bank of Serbia uses the CR5 and CR10 coefficients in its quarterly reports. The matter of (un)justifiability of using one of the CRn coefficients, i.e. its informative capability in both a general case and where the Serbian banking sector is concerned, will remain outside our scope of consideration.

five, i.e. ten largest banks. We deem that the use of these indices is not adequate and argumentative, and we will not consider them. Instead,we can consider the results obtained from the report through the use of the HH index (see Table 5).

Table 5. Hirschman-Herfindahl indices for chosen indicators in Serbian banking sector 2010–2019

Balance variable	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Assets	629	660	678	741	794	796	813	813	779	800
Loans (total)	649	722	721	774	771	763	736	788	793	789
- to population	687	684	687	714	715	729	728	810	812	838
- to companies				788	779	782	768	812	821	840
Deposits (total)	720	714	726	777	818	816	817	827	798	840
- from population	796	799	811	866	903	930	939	977	967	968
Income (total)	679	721	916	844	719	734	804	720	746	818
- interest income	620	640	678	712	736	734	737	767	776	755
- from fees and commissions	739	722	760	828	849	860	879	911	927	930

Source: *Банкарски сектор у Србији. Квартални извештај*. (2010–2020)

All index values in Table 5 are less than 1,000, therefore the market should be by all indicators classified as lowly concentrated. This is constantly emphasized in the NBS 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], which analyzes the period between 2008 and 2012, demonstrated a growth trend of the 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 the HH indices in the Serbian banking sector.

In case of both coefficients (CRn and HH), the limits between different market concentration degrees are set arbitrarily. So, the US authority has been using HH-indices for market classifications since 1982. The limits in its Guidelines were set in 1997 and 210. Firstly, the limits had been set at 1,000 and 1,800, and since 2010, they have been 1,500 and 2,500 (see Table 6). In evaluating horizontal mergers, the Agency (or Agencies, i.e. Department of Justice and the Federal Trade Commission) will consider both the post-merger market concentration and the increase in concentration resulting from the acquisitions and mergers (see Table 6).

Table 6. Degree of concentration in economy branches by HHI values (in anti-monopoly practice in USA)

Types of market concentration	In Guidelines 1997	In Guidelines 2010
Highly concentrated markets	Above 1,800	Above 2,500
Moderately concentrated markets	Between 1,000 and 1,800	Between 1,500 and 2,500
Un-concentrated markets	Below 1,000	Below 1,500

Source: [Horizontal Merger Guidelines, 1997; Horizontal Merger Guidelines, 2010]

The anti-monopoly authority in Russia simultaneously uses both indices, CR and HH. The limits for the three types of market concentration are 45% and 70% for CR3 and 1,000 and 2,000 for

HH, which separate lowly, moderately and highly concentrated markets (see Table 7). The calculated values of the 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 we 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 at the limit between a non-concentrated and a moderately-concentrated market).

Table 7. The classification of branch markets by level of concentration used in the anti-monopoly practice of Russia (ФАС Российской Федерации)

Branch market classification	Value of K3 concentration coefficient	Value of Herfindahl-Hirschman index (HHI)
Lowly concentrated markets	K3≤45%	HHI≤1,000
Moderately concentrated markets	45%<K3<70%	1,000<HHI<2,000
Highly concentrated markets	K3>70%	HHI>2,000

Source: [Федеральная антимонопольная служба, 2016]

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. Of course, given the conditions that dominate our economy (smaller overall market, fewer producers in each production sector etc.), it turns out that this market classification by degree of concentration is inadequate (in nearly any kind of production the value of HHI would be in the second group), so it is possible and recommended that appropriate modifications in Table 6 be made. One such relatively successful attempt was made in the monograph [Begović et al. 2002] (see Table 8).

Table 8. Degree of concentration in economic sectors by value of HHI (modified classification)

Degree of concentration	Value of HHI
Absolutely concentrated	10,000
Extra concentrated	From 2,600 to 10,000
Highly concentrated	From 1,800 to 2,600
Moderately concentrated	From 1,000 to 1,800
Unconcentrated markets	Below 1,000

Source: [Begović et al. 2002]

Obviously, the indices from Tables 4 and 5 show different tendencies through the times. It is, therefore, useful to examine the concentration by using some other indicators. In such analyses, the researchers also use the Gini coefficients and the Lorenz curve. So, we shaped the Lorenz curve (see Figure 2) for the V1, i.e. total assets in 2018. After them, we calculated these (Gini) indices for the observed five variables, for 2016, 2018 and 2020 (I-IX). The results are shown on Table 4.

As we can see, the Gini coefficients for all five variables increased from 2016 to 2018. This shows (undoubtedly?) that the concentration in 2018 is greater than in 2016. It may be an opposite result compared with the results from the use of CRn and HH coefficients. But, in 2019 and 2020 Gini coefficients are significantly lesser in general, that implies the decreasing of the concentration degree. On the other hand, a problem appears in both the Lorenz curve and the Gini coefficient, and this also exists in the usually used CRn and HHI coefficients. It is necessary to define in advance the limits whereby certain, empirically calculated concentration will be classified as high, moderate or low, or on some scale that has been accepted for distinguishing concentration forms.

Table 9. Gini coefficients for the observed indicators in 2016, 2018 and 2020 (I–IX)

	2016	2018	2019	2020
Total assets	0.5681	0.5808	0,5231	0.5244
Deposits and other liabilities	0.5722	0.5856	0,5289	0.5290
Capital	0.5833	0.5935	0,5269	0.5276
Operating income	0.5489	0.5855	0,5156	0.5107
Loans and receivables	0.5544	0.5719	0,5117	0.5151

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

We also calculated here the other indices – Rosenbluth, Tideman-Hall, coefficient of entropy and coefficient of relative entropy for the same period (see Table 10).

Table 10. Rosenbluth, Tideman-Hall, coefficient of entropy and coefficient of relative entropy for Serbian banking sector, 2016 to I –IX 2020

Index	Year	Rosenbluth index	Tideman-Hall index	Coefficient of entropy	Coefficient of relative entropy
Total assetts	2016	0.021	0.081	2.804	0.824
	2018	0.024	0.081	2.795	0.848
	2019	0.025	0.084	2.751	0.844
	2020	0.025	0.084	2.750	0.844
Deposits	2016	0.021	0.082	2.792	0.821
	2018	0.024	0.082	2.786	0.845
	2019	0.025	0.085	2.738	0.840
	2020	0.025	0.085	2.738	0.840
Capital	2016	0.021	0.084	2.759	0.811
	2018	0.024	0.084	2.769	0.840
	2019	0.025	0.085	2.751	0.844
	2020	0.025	0.085	2.750	0.844
Operating income	2016	0.021	0.077	2.850	0.838
	2018	0.024	0.082	2.782	0.844
	2019	0.025	0.083	2.769	0.850
	2020	0.025	0.082	2.774	0.851
Loans	2016	0.021	0.078	2.834	0.833
	2018	0.024	0.080	2.809	0.852
	2019	0.025	0.082	2.768	0.849
	2020	0.025	0.083	2.761	0.847

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

The result show some different tendencies. This is, also, one more reason for further research, i. e. for the use of other methods.

One of them would be the Linda indices. Unlike the previously mentioned ones, the 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 ($IL_m > IL_{m+1}$ 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 to the existence of oligopoly, which are the Linda indices calculated on the basis of the capital value (see Table 11). Besides the Linda indices (V1, V2, V3, V4, and V5, for five variables in Table 11), 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 market. The shares of such perfect competitors are the same to each other, and equal to the value 1/n (n = number of market participants).

Table 11. Linda indices for selected variables in Serbian banking sector in 2017 and I –IX 2020.

Year	IL		IL2	IL3	IL4	IL5	IL6	IL7	IL8	IL9	IL10
2016	V1		0.69	0.49	0.42	0.35	0.32	0.30	0.27	0.25	0.21
	V2		0.63	0.48	0.41	0.35	0.33	0.30	0.27	0.25	0.21
	V3		0.97	0.62	0.44	0.34	0.28	0.25	0.27	0.27	0.23
	V4		0.76	0.51	0.41	0.32	0.29	0.27	0.25	0.23	0.20
	V5		0.70	0.48	0.38	0.32	0.30	0.28	0.25	0.24	0.20
2017	V1		0.77	0.47	0.38	0.32	0.29	0.28	0.26	0.24	0.20
	V2		0.72	0.46	0.37	0.31	0.30	0.28	0.26	0.24	0.20
	V3		0.86	0.55	0.39	0.31	0.27	0.25	0.25	0.25	0.21
	V4		0.85	0.52	0.38	0.30	0.25	0.24	0.24	0.22	0.19
	V5		0.68	0.47	0.37	0.32	0.29	0.26	0.24	0.23	0.20
2018	V1		0.65	0.44	0.36	0.31	0.29	0.26	0.23	0.22	0.19
	V2		0.64	0.43	0.37	0.31	0.27	0.25	0.23	0.23	0.19
	V3		0.68	0.47	0.37	0.30	0.25	0.23	0.24	0.24	0.20
	V4		0.83	0.52	0.38	0.31	0.30	0.27	0.25	0.22	0.19
	V5		0.67	0.47	0.39	0.34	0.30	0.27	0.23	0.23	0.19
2019	V1		0.74	0.46	0.38	0.31	0.29	0.26	0.23	0.21	0.18
	V2		0.78	0.48	0.39	0.32	0.29	0.26	0.23	0.21	0.18
	V3		0.58	0.41	0.36	0.29	0.25	0.22	0.22	0.21	0.18
	V4		0.79	0.52	0.38	0.30	0.28	0.26	0.23	0.21	0.18
	V5		0.79	0.51	0.40	0.33	0.29	0.26	0.23	0.21	0.18
2020	V1		0.67	0.45	0.37	0.30	0.27	0.25	0.23	0.21	0.18
	V2		0.69	0.46	0.38	0.30	0.27	0.24	0.22	0.21	0.18
	V3		0.64	0.44	0.35	0.30	0.26	0.22	0.22	0.21	0.18
	V4		0.80	0.52	0.39	0.30	0.25	0.22	0.20	0.19	0.16
	V5		0.71	0.49	0.41	0.33	0.28	0.26	0.23	0.22	0.18
	PE	1	0.50	0.33	0.25	0.20	0.17	0.14	0.13	0.11	0.10

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

The third variant (variable X3, i.e. capital) indicates the existence of oligopoly (IL8>IL7) in all years: 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 Tables 4 and 5, it could be said with great certainty that the results obtained by the CR3, CR4 and HH coefficients were confirmed, i.e. that the Serbian banking sector in the analyzed years is lowly concentrated. And this is a good foundation for competition development.

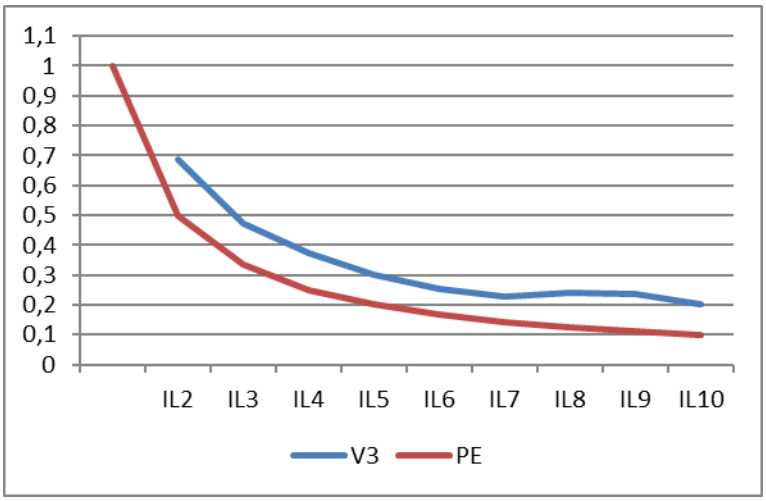

Figure 3. Linda indices for capital and "perfect equilibrium" curve for banking sector, Serbia 2018
Source: Based on financial statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

The graphical representation of the Linda index is also of great interest (see Figure 3). We choose the Linda indices for capital in 2018, the figure is very illustrative. It shows indices for capital, where, as shown in Table 3, indicates the suspicion of oligopolistic structures. Unlike the CRn indices, which are a monotonically increasing function as each following participant is added (CR1<CR2<…<CRn), The Linda indices form a broken curve (Figure 3). The area between IL and PE is called the "oligopolistic arena" and it even visually shows the difference between the real situation and an ideal, perfect competition.

It is important to denote that by the use of aforementioned method of market nuclei [Смарагдов et al. 2015] we get the main nuclei that consist from 9, 9, 7, 9, 11 firms respectively for chosen five variables. This result confirms the nucleus of seven leading banks in Serbia by capital.

The bank shares in the total banking sector capital are shown in Figure 4. They suggest that the first seven banks form an oligopolistic structure – the seventh one in the range (Societe Generale) is greater by over 68% in terms of capital than the next, eighth one (Vojvođanska banka) (the shares are 7.2:4.7, while in 2018 it was 6.5:3.9). If so, of course, this could be a case of a 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 in 2018 is 68.4% and in I –IX 2020 67.9%, very close to the bottom limit of theoretical loose oligopoly. Therefore, such a conclusion can be drawn. The state of the banking market must constantly be observed, because the values of the HH coefficients, and 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.

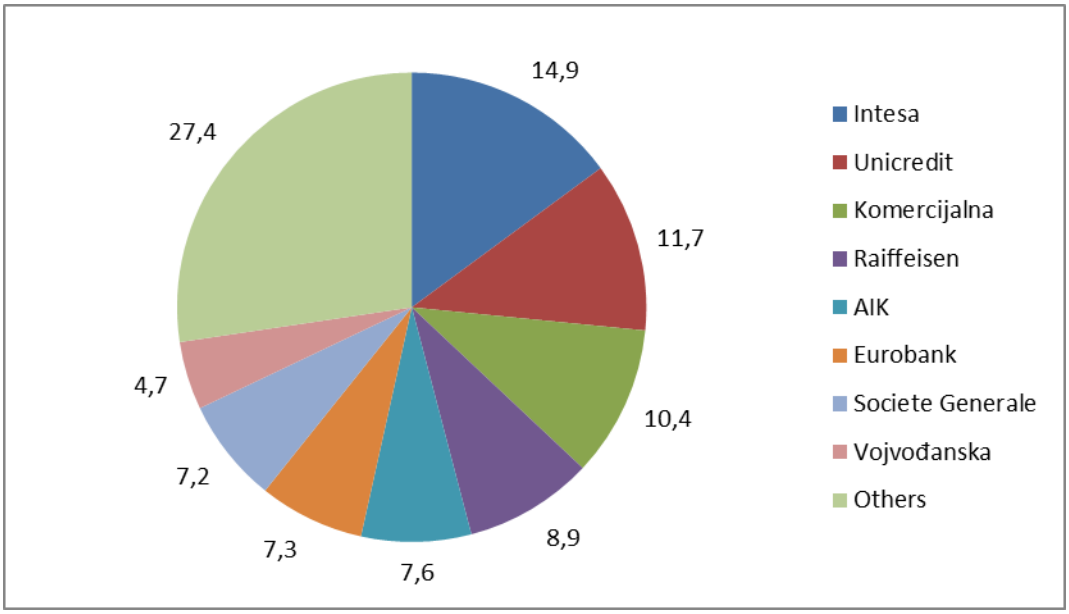

Figure 4.The shares of leading banks in total banking sector capital in I–IX 2020
Source: Based on Financial Statements, http://www.nbs.rs/internet/cirilica/50/50_5.html

At the end we calculated the parameters of the Svetunkov's model (15), see Table 12. Identically for previous calculated indicators, here exist the significant differences of coefficients between the observed variables, as well as some lesser its divergent moves through analyzed period.

Table 12. Coefficients of the Svetunkov's model

Total assets	2016	2018	2019	2020
b	0.170	0.151	0.160	0.152
a	0.168	0.149	0.173	0.172
Deposits	2016	2018	2019	2020
b	0.166	0.151	0.165	0.154
a	0.173	0.149	0.177	0.176
Capital	2016	2018	2019	2020
b	0.196	0.157	0.142	0.149
a	0.178	0.154	0.160	0.164
Operating income	2016	2018	2019	2020
b	0.164	0.171	0.163	0.155
a	0.163	0.158	0.173	0.172
Loans	2016	2018	2019	2020
b	0.158	0.157	0.163	0.159
a	0.167	0.150	0.176	0.177

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

As we can see, coefficients have different values for chosen variables, and the differences not in the least are not significant. If we observe it moves through the analyzed period, we can conclude

that these differences stand greater and complicated, particularly in relation to divergent moves. It can be seen for each of variables itself, also for the values of coefficients, which are very different in the sense of ascending or descending practically for each of observed variables.

CONCLUSION

Despite a multi annual downward trend in the number of banks, the banking market in Serbia is characterized by a relatively large number of banks (26). There are no prominently large banks among them. According to all the chosen indicators (total assets, deposits, capital, operating income and loans), the greatest share in 2020 (I–IX) is held by Banca Intesa 15.2; 15.4; 14.9; 15.5 and 15.9%, respectively. These results are somewhat lower than in 2016 (16.4; 19.6; 16.6; 17.0 and 15.8%, respectively). The concentration indices (CR3, CR4, HH, G, R, TH, CE, also Linda indices IL) indicate a low concentration degree, although close to being moderately concentrated, but also an absence of oligopoly, with the mentioned exception by the results of capital. Even though this does not assume the existence of true competition, these results point to good prospects for the creation and development of competition. In fact, we could state that our results in general confirm the results obtained by [Lončar and 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.

Concentration in the banking sector can have many implications, among them on competitiveness. For that reason it is necessary, on the one hand, that regulatory bodies strictly monitor concentration degree trends, especially since the processes of acquisition and merger, i.e. consolidation of the banking sector can be expected to further intensify in the future. On the other hand, competition in this sector needs to be reviewed and analyzed in a more complex way, which certainly cannot be reduced only to the degree of concentration. 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 emphasize that this research continues our dealing with concentration and competition in the Serbian banking sector. However, we hope that it will be a research subject of other researchers. New approaches would, naturally, be desirable in such future research. On the other side, this may be also of some interest in the comparative analysis of the concentration and competition in Serbian and the banking sectors of the neighboring countries, as well the other former socialist countries, by the use of more indicators than for example in [Barjaktarović et al. 2013].

In addition to the fact that the concentration degree is not high despite its increase, more attention should be paid to 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.

At the end, there is necessary to emphasize different capability of information respective indicators and its different discriminative power. In future research this is fact that is it undoubtedly

necessary particularly not to ignore. The second problem concerning to choice of variables that should be the basis for specification of the degree of concentration. The consideration in this article shown that this choice is not unimportant, as prior else mostly was believed. Therefore this choice set to future research one important question.

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