

# ANALIZA TRŽIŠNE KONCENTRACIJE U BANKARSKOM SEKTORU REPUBLIKE SRBIJE

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## Rezime

*Analiza i merenje nivoa koncentracije bankarskog tržišta je značajna komponenta efikasnog funkcionisanja privrede, pokazatelj razvoja, kako finansijskog, tako i realnog sektora i pokazatelj stepena konkurentnosti u bankarskom sektoru. U ovom radu fokus je na istraživanju i analizi nivoa koncentrisanosti bankarskog tržišta Republike Srbije. Osnovni zadatak i cilj ovog istraživanja se odnosi na analizu nivoa koncentracije na bankarskom tržištu Republike Srbije kroz prizmu dva pokazatelja: racio koncentracije pet najvećih banaka (CR5) i Herfindal-Hiršmanov indeksa koncentracije (HHI), za vremenski period od 2009. godine do 2019. godine. Rezultati istraživanja su pokazali odsustvo koncentracije (ukupno gledano) na domaćem bankarskom tržištu, ali i postojanje trenda (rast tržišnog učešća pet najvećih banaka) koji ukazuje na to da bi u budućem periodu moglo da dođe do narušavanja konkurencije.*

**Ključne reči:** koncentracija, bankarski sektor, bankarsko tržište Republike Srbije, racio koncentracije, Herfindal-Hiršmanov indeks koncentracije

JEL klasifikacija: G21, G32.

## Uvod

Visok nivo konkurencije u nekoj privredi je važan preduslov za njeno efikasno funkcionisanje. Praćenje nivoa konkurencije je unapred regulisano i obavezno kako bi se izbegli oblici nesavršene konkurencije na tržištu, koji se mogu javiti u vidu monopola, duopola ili oligopola (Filipović i saradnici, 2016). Stoga, kontrola nivoa koncentracije predstavlja okosnicu politike zaštite konkurencije u svim sektorima, sa posebnim akcentom na bankarski sektor (Vuković, 2006).

Brojnost banaka i disperzija njihovih pojedinačnih tržišnih udela određuju konkurentsku strukturu bankarskog tržišta, koja se iskazuje koncentracijom. Stoga, tržišna koncentracija predstavlja osnovni činilac i indikator konkurencije između banaka (Vuković, 2006). Tržišna koncentracija spada u red najznačajnijih mera konkurentnosti privrede. Za bankarski sektor konkurencija je bitna, jer utiče na efikasnost, kao i na kvalitet ponuđenih proizvoda i usluga (Alihodžić, 2019). Koncentracija bankarskog sektora se posmatra kroz konkurenciju koja postoji između banaka koje posluju na bankarskom tržištu. Viši stepen koncentracije uslovljava ponašanje banaka koje odstupa od ponašanja u modelu potpune konkurencije, što uslovljava i više cene bankarskih usluga i, u krajnjoj instanci, obezbeđuje veći profit (Jović, 2006). To znači da se visoko koncentrisana tržišta odlikuju relativno nižim stepenom konkurencije, i obrnuto (Mirković, 2016). Na osnovu prethodnih stavova, može se zaključiti da koncentracija može u velikoj meri uticati na stabilnost finansijskog sistema (Ljumović i saradnici, 2014).

Na bankarskom tržištu Republike Srbije trenutno posluje 26 banaka sa licencom Narodne banke Srbije. U Republici Srbiji se, iz godine u godinu, uočava trend smanjenja broja banaka, što je uglavnom posledica spajanja ili pripajanja. Stoga je cilj ovog rada analiza nivoa koncentracije na bankarskom tržištu Republike Srbije, kroz prizmu dva osnovna pokazatelja koji se najčešće koriste za merenje nivoa koncentracije: ratio koncentracije (CR) i Herfindal-Hiršmanov indeks koncentracije. S tim u vezi, predmet istraživanja su bilansne sume, kreditne aktivnosti i depozitni potencijal pet najvećih banaka u Republici Srbiji. Analiza dobijenih rezultata treba da pruži odgovor na pitanje da li nivo koncentracije na domaćem bankarskom tržištu ugrožava njegovu konkurentnost.

Rad je strukturiran kroz tri dela. Nakon uvodnog dela, u prvom delu će biti učinjen osvrt na relevantnu literaturu u segmentu pozitivnih/negativnih implikacija koncentracije banaka na konkurentnost bankarskog sektora. U drugom delu rada će biti prikazani osnovni pokazatelji koji se koriste za analizu nivoa koncentracije na tržištu: ratio koncentracije (CR) i Herfindal-Hiršmanov indeks koncentracije (HHI). U trećem delu rada će posebna pažnja biti posvećena analizi nivoa koncentracije na bankarskom tržištu Republike Srbije u periodu od 2009. godine do 2019. godine. Na kraju rada će biti sublimirane ključne činjenice i biće dati zaključci.

## Pregled relevantne literature

Klasična ekonomska teorija ide u prilog zaključku da je bankarska koncentracija štetna, jer dovodi do narušavanja postulata teorije o potpunoj konkurenciji i vodi ka stanjima na tržištu koja se ogledaju u vidu monopola, oligopola ili duopola (Alihodžić, 2019). Bain (1951) u svom istraživanju navodi da visoka koncentracija tržišne moći dovodi do viših cena i natprosečnih profitnih margina, dok Berger (1995) navodi da niži nivo konkurencije utiče na smanjenje tržišne efikasnosti kroz povećanje monopolskih profita. Međutim, u svom ranijem istraživanju Berger & Hannan (1989) tvrde da će se efikasnost

bankarskog sektora povećati ako se bankarski sistem koncentriše. Da bi podržali ovu hipotezu, oni navode da efikasnije banke brže rastu – drugim rečima, efikasnije banke preuzimaju one koje su manje efikasne.

Prema hipotezi efikasne strukture, preduzeća koja imaju efikasniju proizvodnju bolje posluju, te time postaju i veća, čime im se povećava tržišni udeo, te tržište postaje koncentrisanije (Demsetz, 1973). Claessens & Laeven (2003) u svom istraživanju nisu pronašli negativnu korelaciju između nivoa konkurentnosti i nivoa koncentracije u bankarskom sektoru. Došli su do zaključka da viši nivo koncentracije utiče na povećanje nivoa konkurentnosti. Gelos & Roldós (2004) zaključuju da smanjenje broja banaka ne mora nužno voditi do povećanja koncentracije. Autori studije istraživali su koncentraciju bankarskog sektora širom Centralne Evrope. Njihovi rezultati su pokazali da je, sa smanjenjem broja banaka, došlo do pada nivoa koncentracije, iz razloga što su bivše državne banke sa značajnim tržišnim učešćem izgubile svoj tržišni udeo zbog dominacije srednjih banaka koje su bile prilagodljive novonastalim okolnostima. Takođe, ova studija je upoređivala bankarski sektor širom Centralne Evrope sa azijskim i latinoameričkim. Došlo se do zaključka da je u azijskim zemljama broj banaka opao zbog privatizacije bankarskog sektora, što je za posledicu imalo i pad nivoa koncentracije na bankarskom tržištu. Trend povećanja konkurencije, zbog smanjenog broja banaka, identifikovan je samo u Latinskoj Americi, i to prvenstveno zbog ranog ulaska stranog kapitala, što dovodi do zaključka da je koncentracija bila praćena bankarskom krizom. Levy & Micco (2006) su sprovedeli najobimniju studiju u Latinskoj Americi, identifikujući trend smanjenja broja banaka, ali i trend povećanja koncentracije. Autori ove studije su zaključili da povećanje koncentracije nije rezultiralo smanjenjem konkurencije, već da je direktni uzrok prevremeni ulazak stranih banaka, što se naknadno odrazilo na visok stepen rizika i nestabilnosti u bankarskom sektoru tog područja.

U Republici Srbiji je sprovedeno nekoliko istraživanja sa ovom tematikom. Sva istraživanja su pokazala da je koncentracija u bankarskom sektoru Republike Srbije umerena, uprkos konstantnom smanjenju broja banaka (Marinković 2006; Lončar & Rajić, 2012; Miljković i saradnici, 2013; Barjaktarović i saradnici, 2013; Filipović i saradnici, 2016; Mirković, 2016).

## Pokazatelji kojima se meri koncentracija na tržištu

Veliki broj pokazatelja se koristi za merenje nivoa tržišne koncentracije. U najznačajnije pokazatelje tržišne koncentracije spadaju: racio koncentracije, Herfindal-Hiršmanov indeks koncentracije, Lorenцова kriva, Džini koeficijent, indeks entropije, indeks relativne entropije, sveobuhvatni indeks industrijske koncentracije, Hannah & Kay indeks, Hall-Tideman-ov indeks, Hause indeks (Dumičić i saradnici, 2012). Za potrebe ovog rada razmatrane su vrednosti dva pokazatelja: racio koncentracije (CR) i Herfindal-Hiršmanov indeks koncentracije (HHI).

Racio koncentracije (CR) se najčešće koristi za merenje stepena koncentracije na tržištu. Dobija se kao zbir tržišnih učešća  $n$  najvećih banaka na tržištu (Waldman & Jensen, 2001), i daje odgovor na pitanje koliki deo ukupnog tržišta pokriva grupa od  $n$  banaka (Filipović i saradnici, 2016). Formula za izračunavanje ovog pokazatelja je (Savić, 2000, str. 4):

$$CR_n = \sum_{i=1}^n X_i$$

gde je:

gde je:

$X_i$  – pojedinačno tržišno učešće  $i$ -te banke.

Pojedinačno učešće  $i$ -te banke se dobija na sledeći način (Kostić, 2007, str. 92):

$$X_i = \left( \frac{q_i}{Q} \right) 100$$

gde je:

$q_i$  – ponuda  $i$ -te banke,

$Q$  – ponuda cele grane.

Ovaj pokazatelj se često naziva i CR5, iz razloga što se racio koncentracije odnosi na pet vodećih banaka koje posluju na bankarskom tržištu. U sledećoj tabeli su date referentne vrednosti ovog pokazatelja.

**Tabela 1 - Referentne vrednosti racia koncentracije**

Vrednost CR indeksa	Nivo koncentracije na tržištu
CR = 0%	Savršena konkurencija (nema koncentracije tržišta)
CR < 25%	Nisko koncentrisana tržišta
25% < CR < 50%	Umereno koncentrisana tržišta
CR > 50%	Visoko koncentrisana tržišta
CR = 100%	Monopol (potpuna koncentracija tržišta)

Izvor: Filipović, M., Avramović, V., & Račić, Ž. (2016). Analiza nivoa koncentracije aktive u bankarskom sektoru Republike Srbije. *Škola biznisa 2/2016*, 111-119; Dimić, M. Analiza nivoa koncentracije u bankarskom sektoru i u sektoru osiguranja u zemljama centralne i istočne Evrope. *Doktorska disertacija*, Beograd: Univerzitet Singidunum, 2015.

Prednost, a ujedno i nedostatak ovog pokazatelja, jeste njegova jednostavnost. Racio koncentracije pokazuje ukupno tržišno učešće pet najvećih banaka, ali ne uvažava disperziju tih učešća između samih banaka. Takođe se javlja i problem tržišnog učešća ostalih banaka, jer njihovo tržišno učešće (malo, ali postoji) utiče na koncentraciju celokupne ponude (Begović i saradnici, 2002). Da bi se izbegli nedostaci racia koncentracije, u analizi se koristi Herfindal-Hiršmanov indeks koncentracije.

Najpreciznijim pokazateljem nivoa koncentracije smatra se Herfindal-Hiršmanov indeks koncentracije (HHI). Herfindal-Hiršmanov indeks koncentracije u analizu uključuje tržišno učešće svih banaka na bankarskom tržištu i uzima u obzir veličinu tržišnog učešća između konkurenata (Filipović i saradnici, 2016). Prvenstvena namena HHI jeste procena uticaja procesa spajanja i pripajanja na nivou tržišne koncentracije (Mirković, 2016). HHI predstavlja sumu kvadrata tržišnog učešća svih finansijskih insti-

tucija na tržištu po osnovu zajmova, bilansne sume, kredita, ostvarenog profita, depozita, prikupljene premije osiguranja i slično (Dimić, 2015). Formula za izračunavanje ovog pokazatelja je sledeća (Šaj, 2005, str. 172):

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

pri čemu je:

$n$  – ukupan broj banaka,

$X_i$  – tržišno učešće  $i$ -te banke u sektoru.

Vrednost HHI se kreću u rasponu od 0 do 10.000. U narednoj tabeli su prikazane referentne vrednosti HHI i u skladu s tim, različiti nivoi koncentracije na tržištu.

**Tabela 2 - Referentne vrednosti Herfindal-Hiršmanovog indeksa koncentracije**

Vrednost HHI indksa	Nivo koncentracije na tržištu
HHI < 1.000	Nekoncentraisano tržište
1.000 < HHI < 1.800	Srednje koncentrisano tržište
1.800 < HHI < 2.600	Visoko koncentrisano tržište
2.600 < HHI < 10.000	Veoma visoko koncentrisano tržište
HHI = 10.000	Monopolski koncentrisano tržište

Izvor: Kostić, M. (2008). Merenje koncentracije ponude grane. *Ekonomski horizonti* 10(1), 89-108

Osnovna prednost korišćenja HHI u odnosu na ratio koncentracije se ogleda upravo u činjenici da se u razmatranje uzima tržišno učešće svih entiteta na tržištu. Međutim, najveći nedostatak se ogleda u izostavljanju iz analize onih tržišnih učesnika čije je tržišno učešće ispod 1% (Vuković, 2006). Ipak, navedeno ograničenje ne predstavlja značajnu prepreku primene HHI, tako da se danas HHI # smatra pouzdanim indikatorom merenja tržišne koncentracije na svim tržištima (Dimić, 2015).

## Analiza nivoa koncentracije u bankarskom sektoru Republike Srbije

Analiza nivoa koncentracije u bankarskom sektoru Republike Srbije u ovom radu obuhvata vremenski period od 2009. do 2019. godine. Prvi deo istraživanja se odnosi na merenje racia koncentracija pet najvećih banaka u Republici Srbiji, dok je drugi deo istraživanja vezan za izračunavanje Herfindal-Hiršmanovog indeksa koncentracije.

**Tabela 3 - Broj banaka u bankarskom sektoru Republike Srbije u periodu od 2009. do 2019. godine**

Godina	Broj banaka
2009	34
2010	33
2011	33
2012	32
2013	30
2014	29
2015	30
2016	31
2017	29
2018	27
2019	26

Izvor: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Preuzeto 7. januara 2021, sa [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

U prvom koraku analize izračunate su vrednosti CR5 i to prema bilansnoj sumi pet najvećih banaka, prema njihovoj kreditnoj aktivnosti i prema ukupnim depozitima. Dobile vrednosti CR5 indeksa su prikazane u Tabelama 4, 5 i 6. U drugom koraku analize izračunate su vrednosti Herfindal-Hiršmanovog indeksa koncentracije. Vrednosti HHI prikazane su u Tabeli 7.

**Tabela 4 - Racio koncentracije CR5 prema bilansnoj sumi u periodu od 2009. do 2019. godine**

Godina	Ukupno prvih 5 banaka	Ukupna aktiva bankarskog sektora (mlrd RSD)	CR5 (%)
2009	992,7	2160	45,9%
2010	1142	2534	45,1%
2011	1249	2650	47,1%
2012	1386,6	2880	48,1%
2013	1469	2846	51,7%
2014	1590	2968	53,5%
2015	1653	3048	54,3%
2016	1773	3242	54,6%
2017	1850	3369	55%
2018	2017	3774	53,4%
2019	2182	4084	53,4%

Izvor: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Preuzeto 7. januara 2021, sa [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

**Tabela 5 - Racio koncentracije CR5 prema kreditnoj aktivnosti u periodu od 2009. do 2019. godine**

Godina	CR5 (%)
2009	46,4%
2010	45%
2011	50%
2012	51%
2013	53,2%
2014	53,9%
2015	52,7%
2016	51,2%
2017	53,6%
2018	53,3%
2019	52%

Izvor: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Preuzeto 7. januara 2021, sa [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

**Tabela 6 - Racio koncentracije CR5 prema ukupnim depozitima u periodu od 2009. do 2019. godine**

Godina	CR5 (%)
2009	50,9%
2010	50%
2011	48%
2012	49%
2013	50,4%
2014	52,5%
2015	53,6
2016	54,3%
2017	55,6%
2018	54,1%
2019	54,9%

Izvor: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Preuzeto 7. januara 2021, sa [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

Tabela 7. Izračunavanje HHI za bankarski sektor Republike Srbije

Godina	Bilansna suma	Kreditne aktivnosti	Depozitni potencijal
2009	636	650	731
2010	629	649	720
2011	660	722	714
2012	678	721	726
2013	741	774	777
2014	794	771	818
2015	796	763	816
2016	813	736	827
2017	813	788	827
2018	779	793	798
2019	800	789	840

Izvor: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Preuzeto 7. januara 2021, sa [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

Prosečna vrednost koeficijenta CR5 svedoči o tome da se bankarski sektor Republike Srbije može opisati kao visoko koncentrisan. Počevši od 2009. godine primetan je trend rasta ovog koeficijenta, koji u 2012. godini probija granicu od 50%, što domaći bankarski sektor svrstava u rang visoko koncentrisanih sektora, što pretila da ugrozi konkurenciju na bankarskom tržištu Republike Srbije. Međutim, dobijene vrednosti HHI u sve tri posmatrane kategorije (bilansna suma, kreditna aktivnost i depozitni potencijal) ne prelaze donju graničnu vrednost od 1.000, što bankarsko tržište Republike Srbije svrstava u rang nekonzentrisanih tržišta.

## Zaključak

Na osnovu izvršene analize pokazatelja racia koncentracije (CR) i Herfindal-Hiršmanovog indeksa koncentracije (HHI) mogu se doneti sledeći zaključci. Prema dobijenim vrednostima racia koncentracije pet najvećih banaka, može se zaključiti da je bankarsko tržište Republike Srbije visoko koncentrisano, sa trendom rasta koncentracije i pretnjom narušavanja konkurencije. Međutim, vrednost HHI indeksa koncentracije, kao potpunijeg pokazatelja koncentracije i konkurencije, govori u prilog tome da je bankarsko tržište Republike Srbije nisko koncentrisano.

U Republici Srbiji je 2019. godine poslovalo 26 banaka (7 banaka u vlasništvu domaćih lica, dok je 19 banaka bilo u vlasništvu stranih lica), što je za osam manje nego 2009. godine. Stepenn koncentracije je upravo rezultat konsolidacije, restrukturiranja ili ulaska i izlaska banaka sa bankarskog tržišta. Imajući u vidu trend smanjenja broja banaka na bankarskom tržištu Republike Srbije, kao i vrednosti pokazatelja koncentracije, u budućnosti se može očekivati dalji trend ukupnjavanja bankarskog sektora, što će pitanje analize i praćenja nivoa koncentracije, kao i zaštite konkurencije, u budućnosti činiti sve značajnijim.



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# ANALYSIS OF MARKET CONCENTRATION IN THE BANKING SECTOR OF THE REPUBLIC OF SERBIA

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## Summary

*Analysis and measurement of the level of concentration of the banking market is a significant component of the efficient functioning of the economy, an indicator of the development of both the financial and real sectors and an indicator of the degree of competitiveness in the banking sector. This paper focuses on research and analysis of the level of concentration in the banking market of the Republic of Serbia. The main task and goal of this research is to analyze the level of concentration in the banking market of the Republic of Serbia through the prism of two indicators: the concentration ratio of the five largest banks (CR5) and Herfindahl-Hirschman concentration index (HHI), for the period from 2009 to 2019. The results of the research showed the absence of concentration (overall) in the domestic banking market, but also the existence of a trend (growth of market share of the five largest banks) which indicates that, in the future, there could be distortions of competition.*

**Keywords:** concentration, banking sector, banking market of the Republic of Serbia, concentration ratio, Herfindahl-Hirschman concentration index

**JEL Classification:** G21, G32.

## Introduction

A high level of competition in an economy is an important prerequisite for its efficient functioning. Monitoring the level of competition is regulated in advance and it is mandatory in order to avoid instances of imperfect competition in the market, which can occur in the form of monopoly, duopoly or oligopoly (Filipović et al., 2016). Therefore, the control of concentration levels is the backbone of competition protection policy in all sectors, with special emphasis on the banking sector (Vuković, 2006).

The number of banks and the dispersion of their individual market shares determines the competitive structure of the banking market, which is expressed by concentration. Therefore, market concentration is a basic factor and indicator of competition between banks (Vuković, 2006). Market concentration is one of the most important measures of economic competitiveness. For the banking sector, competition is important, because it affects the efficiency, as well as the quality of the offered products and services (Alihodžić, 2019). Concentration in the banking sector is observed through the competition that exists between banks operating in the banking market. A higher degree of concentration conditions the behavior of banks that deviates from the behavior in the model of complete competition, which further conditions higher prices of banking services and, ultimately, provides higher profits (Jović, 2006). This means that highly concentrated markets are characterized by a relatively lower degree of competition, and vice versa (Mirković, 2016). Based on the previous views, it can be concluded that concentration can greatly affect the stability of the financial system (Ljumović et al., 2014).

There are currently 26 banks operating on the banking market of the Republic of Serbia, with a license from the National Bank of Serbia. In the Republic of Serbia, a decreasing trend in the number of banks is observed from year to year, which is mainly a consequence of mergers or acquisitions. Therefore, the aim of this paper is to analyze the level of concentration in the banking market of the Republic of Serbia, through the prism of two basic indicators that are most often used to measure the level of concentration: concentration ratio (CR) and Herfindahl-Hirschman concentration index. In this regard, the subject of the research are balance sheet amounts, credit activities and deposit potential of the five largest banks in the Republic of Serbia. The analysis of the obtained results should provide an answer to the question of whether the level of concentration on the domestic banking market endangers its competitiveness.

The paper is structured in three parts. After the introductory part, the first part will look at the relevant literature in the segment of positive/negative implications of the concentration of banks on the competitiveness of the banking sector. The second part of the paper will present the basic indicators used to analyze the level of concentration in the market: concentration ratio (CR) and Herfindahl-Hirschman concentration index (HHI). In the third part of the paper, special attention will be paid to the analysis of the level of concentration on the banking market of the Republic of Serbia in the period from 2009 to 2019. At the end of the paper, the key facts will be sublimated, and conclusions will be given.

## Review of Relevant Literature

Classical economic theory supports the conclusion that banking concentration is harmful because it violates the postulates of the theory of complete competition and leads to market conditions that are reflected in the form of monopoly, oligopoly or duopoly (Alihodžić, 2019). Bain (1951) states in his research that a high concentration of market power leads to higher prices and above-average profit margins, while Berger (1995) states that a lower level of competition affects the reduction of market efficiency, through an increase in monopoly profits. However, in their earlier research, Berger & Hannan (1989) argue that the efficiency of the banking sector will increase if the banking system is concentrated. To support this hypothesis, they state that more efficient banks grow faster - in other words, more efficient banks take over those that are less efficient.

According to the hypothesis of efficient structure, companies that have more efficient production do better, and thus become larger, which increases their market share, and the market becomes more concentrated (Demsetz, 1973). In their study, Claessens & Laeven (2003) did not find a negative correlation between the level of competitiveness and the level of concentration in the banking sector. They came to the conclusion that a higher level of concentration affects the increase of the level of competitiveness. Gelos & Roldós (2004) conclude that a decrease in the number of banks does not necessarily lead to an increase in concentration. The authors of the study investigated the concentration of the banking sector across Central Europe. Their results showed that, with the decrease in the number of banks, the level of concentration decreased, due to the fact that former state-owned banks with significant market share lost their market share due to the dominance of medium-sized banks that were more adaptable to the new circumstances. Also, this study compared the banking sector across Central Europe with the Asian and Latin American ones. It was concluded that the number of banks in Asian countries decreased due to the privatization of the banking sector, which resulted in a decrease in the level of concentration in the banking market. The trend of increasing competition, due to the reduced number of banks, was identified only in Latin America, primarily due to the early entry of foreign capital, which leads to the conclusion that the concentration was accompanied by a banking crisis. Levy & Micco (2006) conducted the most extensive study in Latin America, identifying a downward trend in the number of banks, but also an upward trend in concentration. The authors of this study concluded that the increase in concentration did not result in a decrease in competition, but that the direct cause was the early entry of foreign banks, which subsequently reflected on a high degree of risk and instability in the banking sector.

Different research with this topic has been conducted in the Republic of Serbia. All research has shown that the concentration in the banking sector of the Republic of Serbia is moderate, despite the constant decrease in the number of banks (Marinkovic 2006; Loncar & Rajic, 2012; Miljkovic et al., 2013; Barjaktarovic et al., 2013; Filipovic et al., 2016; Mirkovic, 2016).

## Indicators that Measure Market Concentration

A large number of indicators are used to measure levels of market concentration. The most important indicators of market concentration include: concentration ratio, Herfindahl-Hirschman concentration index, Lorenz curve, Gini coefficient, entropy index, relative entropy index, comprehensive industrial concentration index, Hannah & Kay index, Hall-Tideman index, Haid Tideman index, Hause index

(Dumičić et al., 2012). For the purposes of this paper, the values of two indicators were considered: concentration ratio (CR) and Herfindahl-Hirschman concentration index (HHI).

Concentration ratio (CR) is most commonly used to measure the degree of concentration on the market. It is obtained as the sum of market shares of the  $n$  largest banks in the market (Waldman & Jensen, 2001), and provides an answer to the question of how much of the total market is covered by a group of  $n$  banks (Filipović et al., 2016). The formula for calculating this indicator is (Savić, 2000, p. 4):

$$CR_n = \sum_{i=1}^n X_i$$

where in:

$X_i$  - individual market share of the  $i$ -th bank.

The individual participation of the  $i$ -th bank is obtained in the following way (Kostić, 2007, p. 92):

$$X_i = \left(\frac{q_i}{Q}\right) 100$$

where in:

$q_i$  - offer of the  $i$ -th bank,

$Q$  - offer of the whole branch.

This indicator is often called CR5, because the concentration ratio refers to the five leading banks operating in the banking market. The following table gives the reference values of this indicator.

**Table 1 - Concentration Ratio Reference Values**

CR index value	Market concentration level
CR = 0%	Perfect competition (no market concentration)
CR < 25%	Low concentrated markets
25% < CR < 50%	Moderately concentrated markets
CR > 50%	Highly concentrated markets
CR = 100%	Monopoly (complete market concentration)

Source: Filipović, M., Avramović, V., & Račić, Ž. (2016). Analiza nivoa koncentracije aktive u bankarskom sektoru Republike Srbije. *Škola biznisa 2/2016*, 111-119; Dimić, M. Analiza nivoa koncentracije u bankarskom sektoru i u sektoru osiguranja u zemljama centralne i istočne Evrope. *Doktorska disertacija*, Belgrade: Singidunum University, 2015.

The advantage, and at the same time the disadvantage of this indicator, is its simplicity. The concentration ratio shows the total market share of the five largest banks, but does not take into account the dispersion of these shares between the banks themselves. There is also the problem of the market share of other banks, because their market share (small, but present) affects the concentration of the entire supply (Begović et al., 2002). To avoid deficiencies in the concentration ratio, the Herfindahl-Hirschman concentration index is used in the analysis.

The Herfindahl-Hirschman concentration index (HHI) is considered to be the most accurate indicator of concentration levels. The Herfindahl-Hirschman concentration index includes in the analysis the market share of all banks in the banking market and takes into account the size of the market share between competitors (Filipović et al., 2016). The primary purpose of the HHI is to assess the impact of mergers and acquisitions at the level of market concentration (Mirković, 2016). The HHI represents the sum of the squares of the market share of all financial institutions in the market on the basis of loans, balance sheet total, loans, realized profit, deposits, collected insurance premiums, etc. (Dimić, 2015). The formula for calculating this indicator is as follows (Šaj, 2005, p. 172):

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

where:

$n$  - total number of banks,

$X_i$  - market share of the  $i$ -th bank in the sector.

The values of the HHI range from 0 to 10,000. The following table shows the reference values of the HHI index and, accordingly, the different levels of market concentration.

**Table 2 - Reference Values of Herfindahl-Hirschman Concentration Index**

HHI value	Market concentration level
HHI < 1,000	Unconcentrated market
1,000 < HHI < 1,800	Medium concentrated market
1,800 < HHI < 2,600	Highly concentrated market
2,600 < HHI < 10,000	Very highly concentrated market
HHI = 10,000	Monopoly concentrated market

Izvor: Kostić, M. (2008). Merenje koncentracije ponude grane. *Ekonomski horizonti* 10(1), 89-108

The main advantage of using HHI as opposed to the concentration ratio is that the market share of all entities in the market is taken into consideration. However, the biggest defect is the omission of those market participants whose market share is below 1% from the analysis (Vuković, 2006). However, this limitation does not represent a significant obstacle to the application of the HHI, so that today the HHI is considered a reliable indicator of measuring market concentration in all markets (Dimić, 2015).



## Analysis of the Level of Concentration in the Banking Sector of the Republic of Serbia

The analysis of the level of concentration in the banking sector of the Republic of Serbia, in this paper, covers the period from 2009 to 2019. The first part of the research refers to the measurement of the concentration ratio of the five largest banks in the Republic of Serbia, while the second part of the research is related to the calculation of the Herfindahl-Hirschman concentration index.

**Table 3 - Number of Banks in the Banking Sector of the Republic of Serbia in the Period from 2009 to 2019**

Year	Number of banks
2009	34
2010	33
2011	33
2012	32
2013	30
2014	29
2015	30
2016	31
2017	29
2018	27
2019	26

Source: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Downloaded 7 January 2021, from [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

In the first step of the analysis, the values of CR5 were calculated according to the balance sheet total of the five largest banks, according to their credit activity and according to total deposits. The obtained CR5 index values are shown in Tables 4, 5 and 6. In the second step of the analysis, the values of the Herfindahl-Hirschman concentration index were calculated. The values of the HHI are shown in Table 7.



**Table 4 - Ratio of CR5 Concentration According to the Balance Sum in the Period from 2009 to 2019**

Year	A total of the first 5 banks	Total assets of the banking sector (billion RSD)	CR5 (%)
2009	992.7	2160	45.9%
2010	1142	2534	45.1%
2011	1249	2650	47.1%
2012	1386.6	2880	48.1%
2013	1469	2846	51.7%
2014	1590	2968	53.5%
2015	1653	3048	54.3%
2016	1773	3242	54.6%
2017	1850	3369	55%
2018	2017	3774	53.4%
2019	2182	4084	53.4%

Source: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Downloaded 7 January 2021, from [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

**Table 5 - CR5 Concentration Ratio According to Credit Activity in the Period from 2009 to 2019**

Year	CR5 (%)
2009	46.4%
2010	45%
2011	50%
2012	51%
2013	53.2%
2014	53.9%
2015	52.7%
2016	51.2%
2017	53.6%
2018	53.3%
2019	52%

Source: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Downloaded 7 January 2021, from [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

**Table 6 - CR5 Concentration Ratio According to Total Deposits in the Period from 2009 to 2019**

Year	CR5 (%)
2009	50.9%
2010	50%
2011	48%
2012	49%
2013	50.4%
2014	52.5%
2015	53.6
2016	54.3%
2017	55.6%
2018	54.1%
2019	54.9%

Source: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Downloaded 7 January 2021, from [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

**Table 7 - Calculation of the HHI for the Banking Sector of the Republic of Serbia**

Year	Balance sheet total	Credit activity	Deposit potential
2009	636	650	731
2010	629	649	720
2011	660	722	714
2012	678	721	726
2013	741	774	777
2014	794	771	818
2015	796	763	816
2016	813	736	827
2017	813	788	827
2018	779	793	798
2019	800	789	840

Source: Narodna banka Srbije (2020). Bankarski sektor u Srbiji – Kvartalni izveštaj za period od 2009. godine do 2019. godine (Arhiva). Downloaded 7 January 2021, from [https://nbs.rs/sr\\_RS/finansijske-institucije/banke/izvestaji-i-analize/](https://nbs.rs/sr_RS/finansijske-institucije/banke/izvestaji-i-analize/)

The average value of the CR5 coefficient indicates that the banking sector of the Republic of Serbia can be described as highly concentrated. Starting from 2009, there is a noticeable growth trend of this ratio, which in 2012 broke the limit of 50%, which places the domestic banking sector in the rank of highly concentrated sectors, which threatens to impend competition in the banking market of the

Republic of Serbia. However, the obtained values of the HHI in all three observed categories (balance sheet total, credit activity and deposit potential) do not exceed the lower limit value of 1,000, which places the banking market of the Republic of Serbia in the rank of non-concentrated markets.

## Conclusion

Based on the performed analysis of concentration ratio indicators (CR) and Herfindahl-Hirschman concentration index (HHI), the following conclusions can be made. According to the obtained values of the concentration ratio of the five largest banks, it can be concluded that the banking market of the Republic of Serbia is highly concentrated, with a trend of increasing concentration and the threat of distortion of competition. However, the value of the HHI concentration index, as a more complete indicator of concentration and competition, speaks in favor of the fact that the banking market of the Republic of Serbia has a low level of concentration.

In 2019, there were 26 banks operating in the Republic of Serbia (7 banks owned by domestic persons, while 19 banks were owned by foreign persons), which is eight less than in 2009. The degree of concentration is precisely the result of the consolidation, restructuring or entry and exit of banks from the banking market. Having in mind the decreasing trend of the number of banks on the banking market of the Republic of Serbia, as well as the value of concentration indicators in the future, a further trend of enlarging the banking sector can be expected, which will make the matter of analysis and monitoring of concentration levels, as well as the matter of competition protection, ever more significant in the future.

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