Almir Alihodžić

Ekonomski fakultet,
Univerzitet u Zenici
almir.dr2@gmail.com

Prevod
obezbedio
autor

TRŽIŠNA KONCENTRACIJA BANAKA I NEZAPOSLENOST: EVIDENCIJA NA TRŽIŠTU BANAKA BOSNE I HERCEGOVINE I SRBIJE

Rezime

U ovom radu fokusirali smo se na istraživanje odnosa između koncentrisanosti bankarskog sistema Bosne i Hercegovine i Srbije, te uticaj na zaposlenost/nezaposlenosti u obe posmatrane zemlje. Osnovni zadaci i ciljevi istraživanja se odnose na determinisanje uticaja internih faktora banaka na zaposlenost/nezaposlenost, te prepoznavanje efekata unutrašnjih faktora na stopu nezaposlenosti. Kao zavisnu varijablu u ovom istraživanju koristili smo stopu nezaposlenosti, dok su kao nezavisne varijable poslužile sledeće: HHI indeks koncentracije, stopa rasta ukupne bankarske aktive, stopa rasta likvidne aktive prema ukupnoj aktivni. U cilju proučavanja kointegracije varijabli korišćena je metoda automatske regresijske raspodele, kao i metoda korelacije i regresije. Period istraživanja obuhvata period od 2008q1 do 2018q4. Rezultati istraživanja su pokazali da najsignifikantniji značaj na smanjenje nezaposlenosti mogu imati sledeće nezavisne varijable: stopa rasta ukupnih kredita, stopa rasta bankarske aktive, koncentracija kredita i depozita (posebno slučaj banaka u BiH). S druge strane, preveliki obim likvidnih sredstava prema ukupnim sredstvima iznad zakonskog minimum može uticati negativno na privredni rast i zaposlenost.

Ključne reči: stacionarnost, Hirschmann-Herfindahlov indeks, stopa nezaposlenosti, kreditna aktivnost

JEL: E5, G21, J64

MARKET CONCENTRATION OF BANKS AND UNEMPLOYMENT: EVIDENCE FROM THE BANK MARKETS IN BOSNIA AND HERZEGOVINA AND SERBIA

Almir Alihodžić

Faculty of Economics,
University of Zenica
almir.dr2@gmail.com

Translation
provided by
the author

Summary

The paper focuses on researching the relationship between the concentration of the banking systems of Bosnia and Herzegovina and Serbia and the impact of employment/unemployment in both countries. The main tasks and objectives of the research are to determine the impact of internal bank factors on employment/unemployment and to identify the effects of internal factors on the unemployment rate. In this survey, we used the unemployment rate as the dependent variable, while the HHI index of concentration, the rate of growth of total banking assets, the growth rate of liquid assets relative to total assets will be used as independent variables. In order to study the cointegration of variables, the method of automatic regression distribution, as well as the method of correlation and regression, were used. The research period covers the period from 2008q1 to 2018q4. The results of the survey showed that the most significant impact of reducing unemployment could be exerted by the following independent variables: the growth rate of total loans, the growth rate of banking assets, the concentration of loans and deposits (especially the case of banks in B&H). On the other hand, the excessive volume of liquid assets to total assets above the legal minimum can have a negative impact on economic growth and employment.

Keywords: stationarity, Hirschmann-Herfindahl index, unemployment rate, lending activity

JEL: E5, G21, J64

1. Uvodna razmatranja

Poslovne banke imaju značajan uticaj na razvoj drugih privrednih sektora u društvu. Otvaranje banaka namenjenih za finansiranje brzo rastućih sektora u privredi utiče kako na povećanje investicija, tako i na povećanje zaposlenosti. Tržišna koncentracija predstavlja jednu od najvažnijih mera konkurentnosti privrede. U pogledu bankarskog sektora konkurencija je jako bitna, jer, kao i na svakom drugom tržištu, utiče na efikasnost i kvalitet ponuđenih usluga, te utiče i na druge sektore ekonomije. Takođe, koncentracija banaka utiče na bolju efikasnost u kontekstu prikupljanja sredstava, ali s druge strane smanjuje samu raspodelu kredita. S tim u vezi, ako su klijenti više orijentisani na bolje stojeće banke, odobravanje kredita je racionalnije i smanjuje se, gde dužnici sa posebnim uslovima mogu dobiti kredit.

Finansijski model u Bosni i Hercegovini je bankocentričnog tipa kojeg karakteriše jako visok nivo konkurencije. S druge strane, osim konkurencije u bankarskom sistemu BiH je izražena i koncentracija. Ilustracije radi, u bankarskom sistemu Republike Srpske dominantne su četiri velike i četiri male banke, gde banke drže skoro 80% bankarskog tržišta Republike Srpske. U Federaciji BiH pet najvećih banaka drži skoro 74% tržišta kredita i depozita. Finansijski sektor Republike Srbije je takođe modeliran iz poslovnih banaka i predstavlja ključni faktor održavanja finansijske stabilnosti. Na kraju 2017. godine u ukupnoj sumi finansijskog sistema bankarski sektor čini strukturalno učešće od oko 90,7%.

U Bosni i Hercegovini u 2002. godini u cilju jačanja finansijske stabilnosti jedan od preduslova koji je bio postavljen odnosio se na restrukturiranje i privatizaciju bankarskog sektora. U istoj godini ukupan broj banaka u privatnom vlasništvu iznosio je 34 (uglavnom domaće privatno vlasništvo), dok je u državnom vlasništvu bilo 6 banaka i to samo u Federaciji BiH. Ukupan broj zaposlenih sa 31.12.2002. godine iznosio je 7.519. Nakon petnaest godina, tj. u 2017. godini, ukupan broj banaka u privatnom i pretežno privatnom vlasništvu iznosio je 20, dok je broj banaka u državnom vlasništvu iznosio 3. Ukupan broj zaposlenih

iznosio je 9.624. Dakle, došlo je do tendencije smanjenja broja banaka u državnom vlasništvu, kao i ukupnog broja banaka, te do neznatnog povećanja broja zaposlenih. U Srbiji je na kraju 2004. godine bilo ukupno 43 poslovne banke sa 23.463 uposlenih. Od ukupnog broja 11 banaka je bilo u većinskom vlasništvu stranih akcionara, 18 banaka u većinskom vlasništvu domaćih fizičkih i pravnih lica i 14 banaka u većinskom vlasništvu Republike Srbije. Komparacije radi, na kraju septembra 2017. godine poslovalo je ukupno 29 banaka sa ukupno 23.055 zaposlenih. Dakle, došlo je do smanjenja broja banaka za 14 poslovnih banaka, kao i do neznatnog smanjenja broja zaposlenih.

Prosečna stopa nezaposlenosti u EU 28 u 2017. godini bila je najniža od početka globalne ekonomske krize, i iznosila je oko 7%. Bosna i Hercegovina, kao i zemlje okruženja, prema anketnoj stopi nezaposlenosti imale su trend smanjenja stope nezaposlenosti. I pored smanjenja stope nezaposlenosti Bosna i Hercegovina i Makedonija imaju najveće stope nezaposlenosti. Stopa nezaposlenosti u Bosni i Hercegovini na kraju 2017. godine iznosila je oko 20,5%, dok je u Republici Srbiji iznosila oko 13,5%.

Osnovni cilj ovog rada je da se istraži koliko je privatizacija banaka, te uticaj i ulazak stranih banaka u Srbiji i Bosni i Hercegovini imao uticaj na smanjenje ukupne stope nezaposlenosti. Rad je dizajniran iz pet delova. Prvi deo odnosi se na uvodna razmatranja u kontekstu strukture bankarskog sistema, vlasništva, privatizacije, nezaposlenosti. Drugi deo tretira relevantnu literaturu u segmentu pozitivnih/negativnih implikacija koncentracije banaka na ekonomski i privredni rast. Treći deo daje kratak teorijski osvrt na osnovnu meru koncentracije (HHI indeks), te analizu istog kroz sve tri bilansne kategorije, kao i kratku vremensku analizu nezaposlenosti. Četvrti deo odnosi se na podatke neophodne za analizu. Peti deo tretira izabranu metodologiju i dobijene rezultate istraživanja.

2. Pregled relevantne literature

Struktura bankarskog tržišta u poslednjim godinama privukla je značajnu pažnju istraživača i kreatora ekonomske politike, a nekoliko studija je ukazalo na ulogu strukture

1. Introduction

Commercial banks have a significant impact on the development of other economic sectors in a society. Opening of banks intended for financing fast-growing sectors in the economy affect both the increase in investments and the increase in employment. Market concentration is one of the most important measures of competitiveness of the economy. Regarding the banking sector, competition is very important because, as in any other market, it affects the efficiency and quality of the offered services, and also affects other sectors of the economy. Moreover, the concentration of banks affects better efficiency in the context of fundraising, but on the other hand, it reduces the distribution of loans. In this regard, if clients are more oriented towards better banks, the approval of loans is more rational and is reduced, allowing for debtors with special conditions to get a loan.

The financial model in Bosnia and Herzegovina is bank-centric, characterized by a very high level of competition. On the other hand, in addition to the competition in the banking system of BH, there is also a prominent concentration. For the purpose of illustration, in the banking system of the Republic of Srpska, there are four large and four small banks which are dominant, with the banks holding almost 80% of the banking market of the Republic of Srpska. In the Federation of BH, the five largest banks hold almost 74% of the loan and deposit market. The financial sector of the Republic of Serbia is also modelled from commercial banks and is a key factor in maintaining financial stability. At the end of 2017 in the total sum of the financial system, the banking sector accounted for a structural share of about 90.7%.

In Bosnia and Herzegovina, with a view to strengthening financial stability, one of the prerequisites that were set up in 2002 was the restructuring and privatization of the banking sector. In the same year, the total number of privately owned banks amounted to 34 (mostly domestic private ownership), with six state-owned banks, only in the Federation of BH. The total number of employees as of 31 December 2002 was 7,519. After fifteen years, in 2017, the total number of privately owned banks amounted to 20, while the number of

state-owned banks was 3. The total number of employees amounted to 9,624. Thus, there were tendencies to reduce the number of state-owned banks, as well as the total number of banks, accompanied with a slight increase in the number of employees. At the end of 2004, there were 43 commercial banks in Serbia with 23,463 employees. Out of this total, 11 banks had the majority ownership by foreign shareholders, 18 banks had the majority ownership by domestic individuals and legal entities, and 14 banks were majority owned by the Republic of Serbia. By comparison, at the end of September 2017, a total of 29 banks operated with a total of 23,055 employees. In other words, there was a decrease in the number of banks by 14 commercial banks, as well as a slight decrease in the number of employees.

The average unemployment rate in the EU 28 in 2017 was the lowest since the onset of the global economic crisis, amounting to around 7%. Bosnia and Herzegovina, as well as the neighboring countries, according to the surveyed unemployment rate, recorded a downward trend in the unemployment rate. Despite the lowered unemployment rate, Bosnia and Herzegovina and Macedonia recorded the highest unemployment rates. The unemployment rate in Bosnia and Herzegovina at the end of 2017 amounted to about 20.5%, while in the Republic of Serbia it was around 13.5%.

The main goal of this paper is to investigate how much the privatization of banks, along with the influence and entry of foreign banks in Serbia and Bosnia and Herzegovina, had an impact on the reduction of the overall unemployment rate. The paper consists of five parts. The first part refers to the introductory considerations in terms of the structure of the banking system, ownership, privatization, unemployment. The second part deals with the reference literature in the segment of positive/negative implications of the concentration of banks on economic growth. The third part provides a short theoretical review of the basic concentration measure (HHI index) and its analysis across all three balance sheet categories, as well as a short time analysis of unemployment. The fourth part refers to the data necessary for the analysis. The fifth part

bankarskog tržišta u kontekstu efikasnosti banaka, finansijske stabilnosti, transmisije monetarne politike, ekonomskog rasta, te pristupa kreditima. Prema klasičnoj ekonomskoj teoriji, bankarska koncentracija je štetna za ekonomski rast, jer je nepotpuna konkurencija povezana sa neefikasnošću, što kompanijama otežava pristup kreditima. Prema Bain (1951) visoka koncentracija tržišne moći dovodi do viših cena i natprosečnih profitnih margina.

Niži nivo konkurencije utiče na smanjenje tržišne efikasnosti kroz povećanje monopolskih profita (Berger, 1995). Hipoteza efikasne strukture (ES) navodi da je koncentracija rezultat promenljivih uslova u kontekstu troškova, a ne izmeni visine ulaznih barijera. Dakle, preduzeća koja imaju efikasniju proizvodnju bolje posluju, te time postaju i veća, čime im se povećava tržišni udeo, pa tržište postaje koncentrisanije (Demsetz, 1973). Claessens i Laeven (2004) navode da je veća konkurencija u bankarskom sektoru povezana sa bržim rastom ostalih sektora ekonomije koji se uglavnom oslanjaju na vanjsko finansiranje.

U pogledu koncentracije-krhkosti, veće banke na koncentrisanom tržištu slabe stabilnost

Morin i ostali (2012) su sproveli istraživanje o efektu pristupa bankarskih kredita na ekonomske performanse glavnih ekonomskih sektora u Keniji putem panel analize podataka za vremenski period od 2000. do 2010. Rezultati su pokazali da krediti imaju pozitivan i značajan uticaj na bruto domaći proizvod privrednih sektora, sa posebnim akcentom na sektor poljoprivrede.

3. Mere tržišne koncentracije banaka i stopa nezaposlenosti

Herfindahl Hirschman indeks (HHI) predstavlja široko prihvaćenu meru tržišne koncentracije gde se vrednost indeksa dobija kada se tržišni udeli svake institucije (u našem slučaju banaka) pojedinačno kvadriraju. HHI indeks izražava se na sledeći način:

$$HHI = \sum_{j=1}^n (S_j)^2$$

(1)

Tabela u nastavku teksta ilustruje proračun HHI indeksa za plasmane, depozite i aktivu banaka u Federaciji Bosne i Hercegovine za period: 2008q4 - 2018q4.

Tabela 1: Mere koncentracije banaka u Federaciji Bosne i Hercegovine za period: 2008q4 - 2018q4

Mere koncentracije	2008q4	2009q4	2010q4	2011q4	2012q4	2013q4	2014q4	2015q4	2016q4	2017q4	2018q4	Prosek
HHIkrediti	1.806,0	1.740,0	1.642,0	1.486,0	1.427,0	1.510,0	1.511,0	1.537,0	1.662,0	1.692,0	1.692,0	1.609,54
HHI depoziti	1.736,0	1.637,0	1.629,0	1.555,0	1.678,0	1.532,0	1.556,0	1.650,0	1.789,0	1.818,0	1.818,0	1.672,54
HHIaktiva	1.726,0	1.611,0	1.576,0	1.542,0	1.482,0	1.505,0	1.533,0	1.597,0	1.708,0	1.733,0	1.733,0	1.613,27

Izvor: <https://www.fba.ba/index.php?page=37> (prilagodio autor)

kroz tri kanala: a) veće banke se smatraju dovoljno velikim institucijama da bi propale, gde dobijaju garancije od strane vlada što povećava moralni rizik konsekvntno, b) veće banke su pre svega orijentisane da naplaćuju veće kamatne stope zbog svoje tržišne snage, što dovodi do rizičnih plasmana koje preuzimaju zajmoprimci kako bi nadoknadili tako visoke kamatne stope, a posledica svega toga su visoki rizici za zaduživanje i c) menadžerska efikasnost, kao što je diversifikacija rizika u aktivni i pasivni, može da opadne, što utiče na visok nivo operativnog rizika (Allen, Carletti i Marquez, 2011; Boyd i De Nicolo, 2005; Schaeck, Cihak, i Wolfe, 2009).

Iz prethodne tabele se da primetiti da je HHI indeks u pogledu kreditnih plasmana najveću vrednost zabeležio u četvrtom kvartalu 2008. godine (1.806), najnižu u poslednjem kvartalu 2012. godine (1.427) i prosečnu vrednost od 1.609. Ove vrednosti upućuju na zaključak da je bankovno tržište u FBiH umereno koncentrisano sa dominantnim učešćem od 3 do 5 većih banaka u sistemu, koje imaju oligopolsku poziciju. HHI indeks u kontekstu depozita najveću vrednost je ostvario u poslednjem kvartalu 2017. i 2018. godine (1.818), najnižu u poslednjem kvartalu 2013. godine (1.532), te prosečnu vrednost od oko 1.672. Ako posmatramo prosečnu vrednost, onda takođe dolazimo do zaključka da se radi

features the chosen methodology and the obtained research results.

2. Review of Reference Literature

The structure of the banking market in recent years has attracted considerable attention from researchers and economic policy makers, and several studies have pointed to the role of the banking market structure in the context of bank efficiency, financial stability, monetary policy transmission, economic growth, and access to credit. According to the classic economic theory, banking concentration is detrimental to economic growth, as incomplete competition is associated with inefficiency, which makes it difficult for companies to access credit. According to Bain (1951), a high concentration of market power leads to higher prices and higher profit margins.

A lower level of competition affects the reduction of market efficiency through the increased monopoly profits (Berger, 1995). The Effective Structure Hypothesis (ES) states that concentration is the result of the changing conditions in the context of costs rather than altering the height of the input barriers. Hence, the companies that have a more efficient production operate better and thus become larger, thereby increasing their market share, and making the market more concentrated (Demsetz, 1973). Claessens and Laeven (2004) state that the increased competition in the banking sector is associated with the faster growth of other sectors of the economy that rely heavily on external financing.

In terms of concentration fragility, larger banks in a concentrated market weaken the stability through three channels: a) larger banks are considered large enough institutions

to fail, where they receive guarantees from the government, which increases the moral risk, in consequence, b) larger banks are primarily oriented towards charging higher interest rates because of their market power, leading to risky placements taken by borrowers in order to compensate for such high interest rates, resulting in a high risk of borrowing, and c) managerial efficiency such as risk diversification in assets and liabilities may decline which affects the high level of operational risk (Allen, Carletti and Marquez,2011; Boyd and De Nicolo, 2005; Schaeck, Cihak, and Wolfe, 2009).

Morin et al. (2012) conducted a survey on the effect of access to bank loans on the economic performance of the main economic sectors in Kenya through panel data analysis for the period from 2000 to 2010. The results showed that the loans have a positive and significant impact on the gross domestic product of the economic sectors, with a special emphasis on the agricultural sector.

3. Measures of Market Concentration of Banks and Unemployment Rate

The Herfindahl Hirschman Index (HHI) is a widely accepted measure of market concentration where the index value is obtained when the market shares of each institution (in our case, banks) are individually squared. The HHI index is expressed as follows:

$$HHI = \sum_{j=1}^n (S)_j^2 \tag{1}$$

The table below illustrates the HHI index for the placements, deposits and bank assets of the Federation of Bosnia and Herzegovina for the period: 2008q4 - 2018q4.

Table 1: Measures of concentration of banks in the Federation of Bosnia and Herzegovina for the period 2008q4 - 2018q4

Measures of concentration	2008q4	2009q4	2010q4	2011q4	2012q4	2013q4	2014q4	2015q4	2016q4	2017q4	2018q4	Average
HHIloans	1,806.0	1,740.0	1,642.0	1,486.0	1,427.0	1,510.0	1,511.0	1,537.0	1,662.0	1,692.0	1,692.0	1,609.54
HHIdeposits	1,736.0	1,637.0	1,629.0	1,555.0	1,678.0	1,532.0	1,556.0	1,650.0	1,789.0	1,818.0	1,818.0	1,672.54
HHIassets	1,726.0	1,611.0	1,576.0	1,542.0	1,482.0	1,505.0	1,533.0	1,597.0	1,708.0	1,733.0	1,733.0	1,613.27

Source: <https://www.fba.ba/index.php?page=37> (Adjusted by the author)

o umerenoj koncentraciji, međutim u pogledu najveće vrednosti za dve godine tržište bi moglo biti koncentrisano. Zapravo, kao jedan od glavnih razloga visoke štednje u maksimalno do tri banke je visok stepen poverenja s jedne strane, dok se, sa druge strane, kao razlozi mogu navesti: nedostaci alternativnih institucija štednje, nedovoljna razvijenost finansijskog sistema, visok stepen rizičnosti, nedostatak kvalitetnih projekata, itd. Ilustracije

Kada je reč o kretanju indeksa u pogledu depozita, najveća vrednost je zabeležena u četvrtom kvartalu 2017. godine (2.125), najniža vrednost je ostvarena u poslednjem kvartalu 2012. godine (1.558), te prosečna vrednost od oko 1.778. Dakle, kretanje HHI indeksa u pogledu depozita indicira na prisustvo umerene koncentracije. Generalno, štednja u bankama u BiH iz godine u godinu beleži pozitivan rast, što sa jedne strane predstavlja povećanje

Tabela 2: Mere koncentracije banaka u Republici Srpskoj za period: 2008q4 - 2017q4¹

Mere koncentracije	2008q4	2009q4	2010q4	2011q4	2012q4	2013q4	2014q4	2015q4	2016q4	2017q4	Prosek
HHIkrediti	2.148,0	2.072,0	1.960,0	1.680,0	1.550,0	1.479,0	1.655,0	1.681,0	1.741,0	1.933,0	1.789,90
HHI depoziti	1.977,0	1.858,0	1.750,0	1.614,0	1.558,0	1.830,0	1.601,0	1.650,0	1.817,0	2.125,0	1.778,00
HHIaktiva	1.929,0	1.806,0	1.696,0	1.608,0	1.560,0	1.498,0	1.601,0	1.664,0	1.778,0	2.025,0	1.716,50

Izvor: <https://www.abrs.ba/sr/izvjestaji/c3> (prilagodio autor)

radi, ukupni trend rasta štednih depozita kao osnovice finansijskog potencijala banaka u FBiH na kraju 2017. godine iznosio je oko 4,22 milijarde eura. U dve najveće banke u sistemu banaka u FBiH nalazi se skoro 55% štednje, dok preostalih pet banaka ima pojedinačno učešće manje od 2%.

poverenja u bankarski sektor najvećim delom što postoji sistem osiguranja depozita, dok se sa druge strane prednost daje štednji u odnosu na potrošnju kao rezultat neizvesnosti u kontekstu budućih ekonomskih prilika u zemlji.

Za razliku od bilansnih kategorija poslovnih banaka (kredit, depoziti i aktiva) u BiH kod

Tabela 3: Mere koncentracije banaka u Republici Srbiji za period: 2008q4 - 2018q4

Mere koncentracije	2008q4	2009q4	2010q4	2011q4	2012q4	2013q4	2014q4	2015q4	2016q4	2017q4	2018q	Prosek
HHIkrediti	644,0	650,0	649,0	722,0	721,0	774,0	771,0	763,0	736,0	788,0	790,0	728,00
HHI depoziti	696,0	731,0	720,0	714,0	726,0	777,0	818,0	816,0	827,0	827,0	827,0	770,81
HHIaktiva	617,0	636,0	629,0	660,0	678,0	741,0	794,0	796,0	813,0	813,0	809,0	726,00

Izvor: https://www.nbs.rs/internet/cirilica/55/55_4/index.html (prilagodio autor)

U bankarskom sektoru Republike Srpske zabeležene su neznatno više vrednosti HHI indeksa po sve tri kategorije bilansnih bankarskih pozicija. Najveća vrednost HHI indeksa u kontekstu kategorije kredita ostvarena je u četvrtom kvartalu 2008. godine (2.148), dok je sa druge strane najniža vrednost zabeležena u četvrtom kvartalu 2013. godine (1.479). Prosečna vrednost HHI indeksa kategorije kredita iznosila je 1.790, što indicira na prisustvo umerene koncentracije u sistemu.

kojih je zabeležena umerena koncentracija, kod poslovnih banaka u Srbiji po sve tri posmatrane bilansne kategorije nije prisutna koncentracija. Kao jedan od razloga mogao bi biti veći broj banaka u domaćem vlasništvu (na kraju četvrtog kvartala 2010. godine broj banaka u domaćem vlasništvu je bio oko 10, dok je na kraju četvrtog kvartala 2017. godine taj broj smanjen na svega 8 banaka).

Na tržištu rada u zemljama EU registrovane su niže stope nezaposlenosti u 2018. godini, gde

1 Izveštaj o stanju u bankarskom sistemu Republike Srpske nije dostupan sa 31.12.2018. godine.

From the above table it can be noted that the HHI index in terms of loans recorded the highest value in the fourth quarter of 2008 (1,806), the lowest in the last quarter of 2012 (1,427) and the average value of 1,609. These values point to the conclusion that the banking market in the FB&H is moderately concentrated with a dominant share of 3 to 5 larger banks in the system, which have an oligopoly position. HHI index in terms of deposits reached the highest value in the last quarter of 2017 and 2018 (1,818), the lowest in the last quarter of 2013 (1,532) and the average value of 1,672. If we observe

FB&H, while the remaining five banks have an individual share of less than 2.0%.

The banking sector of the Republic of Srpska recorded slightly higher values in terms of the HHI index for all three categories of the balance sheet banking positions. The highest value of the HHI index in terms of loans was recorded in the fourth quarter of 2008 (2,148), while on the other hand the lowest value was recorded in the fourth quarter of 2013 (1,479). The average value of the HHI index in the loans category amounted to 1,790, which indicates the presence of moderate concentration in the system. When

Table 2: Measures of concentration of banks in the Republic of Srpska for the period 2008q4 - 2017q4¹

Measures of concentration	2008q4	2009q4	2010q4	2011q4	2012q4	2013q4	2014q4	2015q4	2016q4	2017q4	Average
HHIloans	2,148.0	2,072.0	1,960.0	1,680.0	1,550.0	1,479.0	1,655.0	1,681.0	1,741.0	1,933.0	1,789.90
HHIdeposits	1,977.0	1,858.0	1,750.0	1,614.0	1,558.0	1,830.0	1,601.0	1,650.0	1,817.0	2,125.0	1,778.00
HHIassets	1,929.0	1,806.0	1,696.0	1,608.0	1,560.0	1,498.0	1,601.0	1,664.0	1,778.0	2,025.0	1,716.50

Source: <https://www.abrs.ba/sr/izvjestaji/c3> (Adjusted by the author)

the average value, then we also come to the conclusion that this is a moderate concentration, but in terms of the maximum value in two years, the market could be concentrated. In fact, as one of the main reasons for high savings in up to three banks, there is a high degree of trust on the one hand, while on the other hand, the possible reasons could be: no alternative savings institutions, insufficient development of the financial system, high level of risk, lack of quality projects, etc. For illustration purposes, the overall trend of savings deposits as a base for the financial potential of banks in the FB&H at the end of 2017 amounted to about 4.22 billion euros. Nearly 55% of savings are in the two largest banks in the banking system in the

it comes to the movement of the index in terms of deposits, the highest value was recorded in the fourth quarter of 2017 (2,125), the lowest value was recorded in the last quarter of 2012 (1,558), with the average value of 1,778. Therefore, the movement of the HHI index in terms of deposits indicates the presence of a moderate concentration. Generally speaking, savings in banks in the BH have been recording positive growth every year, which on the one hand reflects an increase in confidence in the banking sector largely because of the deposit insurance system, while on the other hand, advantage is given to savings in relation to consumption as a result of uncertainty in the context of future economic opportunities in the country.

Table 3: Measures of concentration of banks in the Republic of Serbia for the period 2008q4 - 2018q4

Measures of concentration	2008q4	2009q4	2010q4	2011q4	2012q4	2013q4	2014q4	2015q4	2016q4	2017q4	2018q	Average
HHIloans	644.0	650.0	649.0	722.0	721.0	774.0	771.0	763.0	736.0	788.0	790.0	728.00
HHIdeposits	696.0	731.0	720.0	714.0	726.0	777.0	818.0	816.0	827.0	827.0	827.0	770.81
HHIassets	617.0	636.0	629.0	660.0	678.0	741.0	794.0	796.0	813.0	813.0	809.0	726.00

Source: https://www.nbs.rs/internet/cirilica/55/55_4/index.html (Adjusted by the author)

1 Report on the situation in the banking system of the Republic of Srpska as of 31 December 2018 is not available.

Tabela 4: Komparativan pregled stope nezaposlenosti zemalja regiona i pojedinih zemalja članica EU za period: 2008 - 2017. (u%)

Zemlje	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Prosek
Srbija	14,0	16,0	19,2	23,0%	24,0%	22,1%	19,4%	17,9%	15,3%	13,5%	18,44%
Bosna i Hercegovina	23,4	24,1	27,2	27,6%	28,0%	27,5%	27,5%	27,7%	25,4%	20,5%	25,89%
Hrvatska	9,0%	9,0%	11,7%	13,3%	15,1%	17,0%	17,3%	16,3%	12,8%	11,1%	13,26%
Crna Gora	16,0%	19,0%	19,9%	20,2%	19,8%	19,5%	18,0%	17,5%	17,8%	16,1%	18,38%
Makedonija	33,0%	32,0%	32,6%	31,2%	31,1%	29,1%	28,0%	26,1%	23,8%	22,4%	28,93%
Bugarska	6,6%	6,5%	10,3%	11,2%	12,4%	13,0%	11,4%	9,4%	7,7%	6,3%	9,48%
Rumunija	4,4%	6,9%	7,3%	7,3%	7,3%	7,2%	6,8%	6,8%	5,9%	4,9%	6,48%

Izvor: <https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00203&plugin=1> Agencije za statistiku posmatranih zemalja (preuzeto: 28.04.2019)

je u EU 28 zabeležena stopa od 6,8%, dok je u EU 27 ostvarena stopa od takođe 6,8%, što je niže u odnosu na 2017. godinu za oko 10%. Evidentno je da je najveća prosečna stopa nezaposlenosti posle Makedonije (28,93%) ostvarena kod Bosne i Hercegovine od oko 25,89%. Za posmatrani period BiH je imala najnižu stopu nezaposlenosti u 2008. godini od 23,4%, a najviša je zabeležena u 2012. godini od 28,0%. Rast nezaposlenosti se nije se reflektovao u toku globalne ekonomske krize, već dve godine nakon krize, gde je BiH sve do 2012. godine imala rastući trend stope nezaposlenosti usled oslabljene ekonomske aktivnosti realnog sektora, pridošle nove radne snage, te dugugodišnjeg statusa lica u svojstvu nezaposlenih. Blagi pad stope nezaposlenih u BiH je ostvaren tek od 2016. godine, tako da je stopa nezaposlenih u 2017. godini iznosila 20,5%. Treće mesto po visini prosečne stope nezaposlenosti pripada Srbiji sa stopom od oko 18,44%. Najniža stopa nezaposlenosti u Srbiji ostvarena je u 2017. godini (13,5%), dok je sa druge strane najveća stopa nezaposlenosti evidentirana u 2012. godini (24,0%). Sve do 2012. godine u Srbiji je bio evidentan rastući trend nezaposlenosti, koji je zamenjen opadajućom

putanjom od 2013. godine pa do 2017. godine. Prema Anketi o radnoj snazi u Republici Srbiji, ukupna stopa zaposlenosti je iznosila u proseku oko 46,7% i bila je za oko 1,5% veća u odnosu na prethodnu godinu. Zaposlenost je imala najveće učešće prema uslužnim sektorima privrede, koji u najvećoj meri daju doprinos rastu bruto domaćeg proizvoda, dok je zaposlenost u poljoprivredi smanjena. Najniže prosečne stope nezaposlenosti ostvarene su u Rumuniji od oko 6,48% i Bugarskoj od oko 9,48%. Grafik u nastavku teksta analizira tendenciju kretanja prosečnog broja zaposlenih u jednoj banci u Srbiji i Bosni i Hercegovini za period: 2008q4 - 2017q4.

Grafik 1: Prosečan broj zaposlenih u jednoj banci u Srbiji i Bosni i Hercegovini za period: 2008q4 - 2017q4

Izvor: <https://www.nbs.rs>, <https://www.fba.ba/bs/publikacije-banke>, <https://www.abrs.ba/sr/izvestaji/c3> (prilagodio autor)

Iz prethodnog grafika se vidi da je prosečan broj zaposlenih u jednoj banci u Srbiji imao prosečno volatilan trend, za razliku od Bosne i Hercegovine gde je u poslednjem kvartalu

In contrast to the balance sheet categories of commercial banks (loans, deposits, and assets) in BH where moderate concentration was recorded, there is no concentration in commercial banks in Serbia for all three observed balance sheet categories. One of the reasons could be a higher number of domestic-owned banks (at the end of the fourth quarter of 2010, there were 10 domestic-owned banks, while at the end of the fourth quarter of 2017 this number was reduced to 8 banks).

The labour market in the EU countries registered lower unemployment rates in 2018, with a rate of 6.8% in the EU28, while in the EU27 the rate was also 6.8%, which is

of the unemployed persons. A slight drop in the unemployment rate in BH was achieved only in 2016, and the unemployment rate in 2017 stood at 20.5%. The third place in terms of the average unemployment rate belongs to Serbia with a rate of around 18.44%. The lowest unemployment rate in Serbia was recorded in 2017 (13.5%), while on the other hand the highest unemployment rate was registered in 2012 (24.0%). Until 2012, a growing unemployment trend was evident in Serbia, which has been replaced by a declining trend from 2013 to 2017. According to the Labour Force Survey in the Republic of Serbia, the total employment rate was on

Table 4: Comparative review of the unemployment rate in the countries of the region and individual EU member states for the period 2008 - 2017 (in %)

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
Serbia	14.0	16.0	19.2	23.0%	24.0%	22.1%	19.4%	17.9%	15.3%	13.5%	18.44%
Bosnia and Herzegovina	23.4	24.1	27.2	27.6%	28.0%	27.5%	27.5%	27.7%	25.4%	20.5%	25.89%
Croatia	9.0%	9.0%	11.7%	13.3%	15.1%	17.0%	17.3%	16.3%	12.8%	11.1%	13.26%
Montenegro	16.0%	19.0%	19.9%	20.2%	19.8%	19.5%	18.0%	17.5%	17.8%	16.1%	18.38%
Macedonia	33.0%	32.0%	32.6%	31.2%	31.1%	29.1%	28.0%	26.1%	23.8%	22.4%	28.93%
Bulgaria	6.6%	6.5%	10.3%	11.2%	12.4%	13.0%	11.4%	9.4%	7.7%	6.3%	9.48%
Romania	4.4%	6.9%	7.3%	7.3%	7.3%	7.2%	6.8%	6.8%	5.9%	4.9%	6.48%

Source: <https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00203&plugin=1> Agencies for statistics of the observed countries (Retrieved: 28.04.2019)

lower than in 2017 by about 10%. It is evident that the highest average unemployment rate after Macedonia (28.93%) was recorded in Bosnia and Herzegovina, standing at about 25.89%. In the observed period, BH had the lowest unemployment rate of 23.4% in 2008, and the highest of 28.0% in 2012. The rising unemployment was not reflected during the global economic crisis, but two years after the crisis, with BH recording a rising trend in the unemployment rate up until 2012, due to the weakened economic activity of the real sector, the new labour force and the long-term status

average about 46.7%, which was by about 1.5% higher than in the previous year. Employment had the largest share in the service sectors of the economy, which largely contributed to the growth of the gross domestic product, while employment in agriculture was reduced. The lowest average unemployment rates were recorded in Romania, about 6.48% and Bulgaria, about 9.48%. The figure below analyses the tendency of movements in the average number of employees in one bank in Serbia and Bosnia and Herzegovina for the period 2008q4 - 2017q4.

2017. godine bio veći broj uposlenih u jednoj banci nego u početnom posmatranom periodu. Dakle, ovo nije realna situacija s obzirom da su se od 2016. godine pa nadalje u bankama u BiH dešavale statusne promene u kontekstu spajanja banaka, gde je došlo do koncentracije broja zaposlenih u bankama sa većim tržišnim učešćem. Ilustracije radi, ukupan broj banaka u BiH u četvrtom kvartalu 2008. godine iznosio je 30, dok je ukupan broj uposlenih iznosio 11.054. U poslednjem kvartalu 2017. godine ukupan broj poslovnih banaka u BiH iznosio je 23, dok je ukupan broj zaposlenih iznosio 9.623. Dakle, zaista je došlo do smanjenja kako broja banaka, tako i uposlenika, što se duguje različitim faktorima poput: uticaja globalne finansijske krize, racionalizacije poslovanja, jačanja tržišnog uticaja kroz statusne promene spajanja, gubljenja licence za rad, itd. Za vreme globalne finansijske krize i u postkriznom periodu strane poslovne banke u Srbiji su počele sa tendencijom delimičnog smanjivanja broja uposlenih, dok su domaće banke u istom periodu u manjem broju primale nove uposlenike. Kao što se na grafiku 1 može primetiti, prosečan broj uposlenih u jednoj banci u Srbiji u četvrtom kvartalu 2008. godine iznosio je oko 951, dok je taj broj znatno smanjen u poslednjem kvartalu 2017. godine na oko 795 uposlenika. Od 2015. pa skoro do 2017. godine, domaće banke u Srbiji su neznatno povećavale broj uposlenih, dok su strane poslovne banke za isti period neznatno smanjivale broj uposlenika. Treba napomenuti da Srbija ima veći broj banaka u domaćem vlasništvu za razliku od Bosne i Hercegovine.

4. Podaci

Ova analiza se fokusira na sledeće varijable: zavisna varijabla će biti stopa rasta nezaposlenosti u BiH i Srbiji (GRUN), dok će se stopa rasta ukupne aktive (GRTBA),

stopa rasta ukupnih kredita (GRTL), stopa rasta likvidne aktive prema ukupnoj aktivi (GRLATA), bankarska koncentracija kredita, depozita i aktive merena preko HHI indeksa (BCkredita, BCdepozita i BCaktive) posmatrati kao nezavisne varijable. Izbor posmatranih varijabli i analize je visoka stopa nezaposlenosti kako u Bosni i Hercegovini sa jedne strane, te doprinos bankarskog sektora na smanjenje stope nezaposlenosti sa druge strane. Istraživanje obuhvata period od prvog kvartala 2008. godine do četvrtog kvartala 2018. godine. Analiza će se bazirati na kvartalnim podacima jer su podaci na godišnjem nivou nepouzdati uzorak za ekonometrijsku evaluaciju. Podaci su prikupljeni sa službenih stranica Centralne banke Bosne i Hercegovine, Agencije za bankarstvo Federacije BiH, Agencije za bankarstvo Republike Srpske, Agencije za državnu statistiku BiH, Narodne banke Republike Srbije, Republičkog zavoda za statistiku Srbije. Merenje i očekivani efekat zavisnih i nezavisnih varijabli dati su u nastavku teksta.

Tabela 5: Kratki opis zavisne i nezavisnih varijabli u modelu

Varijabla	Oznaka	Očekivani efekat
Stopa rasta nezaposlenosti	GRUN	
Stopa rasta likvidne aktive prema ukupnoj aktivi	GRLATA	(+)
Stopa rasta ukupne bankarske aktive	GRTBA	(-)
Stopa rasta ukupnih kredita	GRTL	(-)
Bankarska koncentracija aktive merena preko HHI indeksa	HHIASSET	(+)
Bankarska koncentracija kredita merena preko HHI indeksa	HHICREDIT	(-)
Bankarska koncentracija depozita merena preko HHI indeksa	HHIDEPOSITS	(-)

Izvor: proračun autora

Stopa rasta nezaposlenosti - proračunata je kao odnos između broja nezaposlenih i veličine radne snage. Stopa nezaposlenosti ima trend kretanja u skladu sa trendom poslovnog ciklusa, gde u vreme recesije ona raste, dok u vreme prosperiteta i ekspanzije ona opada.

Stopa rasta likvidne aktive prema ukupnoj aktivi - proračunava se tako što se uzmu u razmatranje najlikvidniji delovi aktive banaka, te podele ukupnom aktivom i isti iznos pomoži sa 100.

Figure 1: Average number of employees in one bank in Serbia and Bosnia and Herzegovina for the period 2008q4 - 2017q4

Source: <https://www.nbs.rs>, <https://www.fba.ba/bs/publikacije-banke>,
<https://www.abrs.ba/sr/izvjestaji/c3> (Adjusted by the author)

The figure above shows that the average number of employees in one bank in Serbia had an average volatile trend, unlike Bosnia and Herzegovina which in the last quarter of 2017 recorded a higher number of employees in one bank than in the initial observed period. Therefore, this is not a realistic situation given that since 2016 there have been changes in terms of bank mergers, resulting in the concentration of the number of employees in banks with higher market shares. For illustration purposes, the total number of banks in BH in the fourth quarter of 2008 was 30, while the total number of employees amounted to 11.054. In the last quarter of 2017, the total number of commercial banks in BH was 23, while the total number of employees amounted to 9.623. Therefore, there has been a decrease in both the number of banks and employees due to various factors such as the impact of the global financial crisis, the rationalization of operations, the strengthening of market influence through status changes of mergers, loss of operating licenses, etc. During the global financial crisis and in the post-crisis period, foreign commercial banks in Serbia began to tend to partially reduce the number of employees, while domestic banks in the same period received fewer new employees. As figure 1 shows, the average number of employees in one bank in Serbia in the fourth quarter of 2008 was about 951, while this number was significantly reduced in the last quarter of 2017 to about 795 employees. From 2015 until 2017, domestic banks in Serbia slightly increased the number of employees, while foreign commercial banks in the same

period reduced the number of employees. It should be noted that Serbia has a larger number of domestic-owned banks, unlike Bosnia and Herzegovina.

4. Data

This analysis focuses on the following variables: the dependent variable will be the rate of unemployment in BH and Serbia (GRUN), while the growth rate of total banking assets (GRTBA), the total growth rate (GRTL), the growth rate of liquid assets to total assets GRLATA), the banking concentration of loans, deposits and assets measured through the HHI index (BCloans, BCdeposits, and BCassets) will be used as independent variables. The selection of the observed variables and analysis is the high unemployment rate in Bosnia and Herzegovina on the one hand and the contribution of the banking sector to reducing the unemployment rate on the other. The survey covers the period from the first quarter of 2008 to the fourth quarter of 2018. The analysis will be based on quarterly data because the annual level data are an unreliable sample for econometric evaluation. The data have been collected from the official pages of the Central Bank of Bosnia and Herzegovina, the Banking Agency of the Federation of Bosnia and Herzegovina, the Banking Agency of the Republic of Srpska, Agency for Statistics of BH, National Bank of Serbia and Statistical Office of the Republic of Serbia. The measurement and expected effects of dependent and independent variables are given below.

Stopa rasta ukupne bankarske aktive - proračunata je kao razlika bankarske aktive tekućeg kvartala u odnosu na prethodni kvartal, te dobijeni iznos podeljen sa prethodnim kvartalom i pomožen sa 100.

Stopa rasta ukupnih kredita - proračunata je kao razlika ukupnih kredita tekućeg kvartala u odnosu na prethodni kvartal, te dobijeni iznos podeljen sa prethodnom godinom i pomožen sa 100.

Bankarska koncentracija merena preko Herfindahl-Hirschman indeksa - predstavlja značajnu meru koncentracije. Vrednosti HHI indeksa se kreću u intervalu od 0 do 10.000. Indeks koncentracije ne raste linearno, što na primer znači da ako je iznos 3.000 koncentracija u sistemu nije 30%. Ako se indeks koncentracije kreće u rasponu od 0 do 1.000 smatra se da tržište nije koncentrisano, već da je prisutan visok nivo konkurencije. Ako se HHI indeks kreće u rasponu od 1.000 do 1.800 onda se može reći da postoji umerena koncentracija tržišta. I, ako je vrednost indeksa u rasponu od 1.800 do 10.000, tržište je koncentrisano, odnosno postoji monopol (Agencija za bankarstvo Federacije Bosne i Hercegovine, 2017).

5. Metodologija

U cilju testiranja stacioniranosti varijabli koristićemo ARDL metodologiju kao i metod korelacije i regresije. Kako bi se istražio uticaj bankarske koncentracije, te unutrašnji i vanjski faktori poslovanja bankarskog sektora na zaposlenost/nezaposlenost u Bosni i Hercegovini i Srbiji za analizu na kratak i dugi rok korišćen je sledeći model:

$$GRUN_t = \beta_0 + \beta_1 GRLATA_t + \beta_2 GRTBA_t + \beta_3 GRTL_t + \beta_4 HHIasset_t + \beta_5 HHIcredit_t + \beta_6 HHIdeposits_t + \varepsilon_t \quad (2)$$

gde je:

$GRUN_t$ - stopa nezaposlenosti u vremenu t

$GRLATA_t$ - stopa rasta likvidne aktive prema ukupnoj aktivi u vremenu t

$GRTBA_t$ - stopa rasta ukupne poslovne aktive poslovnih banaka u vremenu t

$GRTL_t$ - stopa rasta ukupnih kredita poslovnih banaka u vremenu t

$HHIasset_t$ - bankarska koncentracija aktive merena putem HHI indeksa u vremenu t

$HHIcredit_t$ - bankarska koncentracija kredita

merena putem HHI indeksa u vremenu t

$HHIdeposits_t$ - bankarska koncentracija depozita merana putem HHI indeksa u vremenu t

ε_t - regresioni rezidual u vremenu t .

Da bismo testirali statističku značajnost prethodnih varijabli koristili smo generalizovani test jediničnog korena, tj. Dickey - Fuller test sa širinom porekla i trenda i bez širine porekla i trenda.

5.1. Rezultati istraživanja

5.1.1. Bosna i Hercegovina

Najveća vrednost aritmetičke sredine je ostvarena kod stope nezaposlenosti od oko 516 %, zatim kod stope rasta likvidne aktive prema ukupnoj aktivi od oko 27%, stope rasta bankarske aktive od 23%, te stope rasta kredita od oko 16%. Najveću volatilnost u kontekstu statističkih merila prvog reda, tj. standardne devijacije, je takođe zabeležila stopa rasta nezaposlenosti od oko 32%, što prati isti trend kao i aritmetička sredina. Drugo mesto u pogledu standardne devijacije pripada stopi rasta bankarske aktive (3,03%), na trećem mestu je stopa rasta likvidnih sredstava (2,48%), te stopa rasta ukupnih kredita od oko 1,78%.

Učešće likvidnih sredstava u ukupnim sredstvima banaka u Bosni i Hercegovini je svoju maksimalnu vrednost doseglo u 2007. godini, od oko 41%, u 2013. godini likvidna sredstva su iznosila oko 19% u odnosu na ukupna sredstva i u 2018. iznos doseže vrednost od oko 29%. Evidentno je da su poslovne banke u BiH više nego likvidne, gde zbog nedostatka kvalitetnih projekata i investicija racionališu sa plasmanima s jedne strane, i drže neaktivna likvidna sredstva sa druge strane. Ovo je pre svega jedan od glavnih argumenata usporenog generisanja ekonomskog rasta i razvoja, te zaposlenosti sa druge strane. Jedno od mogućih rešenja aktiviranja bankarskih plasmana je formiranje domaće institucije koja će dodeljivati rejting najuspešnijim preduzećima i praćenje njihove efektivnosti i efikasnosti. Dakle, na ovaj način bi se oslobodio višak likvidnih sredstava banaka i povećao stepen poverenja banaka prema jednom delu realnog sektora Bosne i Hercegovine. Jedna od preciznijih mera volatilnosti, mera asimetrije, može se definisati kao odnos trećeg momenta oko sredine i

Table 5: A brief description of dependent and independent variables in the model

Variable	Abbreviation	Expected effect
The growth rate of unemployment	GRUN	
The growth rate of liquid assets to total assets	GRLATA	(+)
The growth rate of total banking assets	GRTBA	(-)
Total growth rate	GRTL	(-)
Banking concentration of assets measured through the HHI index	HHIasset	(+)
Banking concentration of loans measured through the HHI index	HHIcredit	(-)
Banking concentration of deposits measured through the HHI index	HHIdeposits	(-)

Source: Author's own study

The growth of the unemployment rate (GRUN) - It is calculated as the ratio between the number of unemployed and the size of the workforce. The unemployment rate has a trend of movement in line with the business cycle trend, i.e. in the recession, it is growing, while in the time of prosperity and expansion it is declining.

The growth rate of liquid assets to total assets (GRLATA) - It is calculated by considering the most liquid parts of bank assets, dividing them by total assets, and multiplying this amount by 100.

The growth rate of total banking assets (GRTBA) - It is calculated as the difference between the banking assets of the current quarter and the previous quarter, divided by the amount from the previous quarter and multiplied by 100.

The growth rate of total loans (GRTL) - It is calculated as the difference between total loans of the current quarter and the previous quarter, divided with the amount from the previous year and multiplied by 100.

Bank concentration measured through Herfindahl-Hirschman index - HHI can take different values in an interval from 0 to 10,000. The concentration index does not grow linearly, which means that, for example, an amount of 3,000 does not mean that the concentration in the system is 30%. If the concentration index ranges from 0 to 1,000, the market is considered to be unconcerned, that is, a high level of competition is present.

If the index ranges from 1,000 to 1,800, then it can be said that there is a moderate concentration of the market. And if the index ranges from 1,800 to 10,000, the market is concentrated, i.e., there is a monopoly (Banking Agency of the Federation of Bosnia and Herzegovina, 2017).

5. Methodology

In order to test the stationing of the variables, we will use the ARDL

methodology as well as the method of correlation and regression. In order to investigate the impact of banking concentration, internal and external factors of the banking sector in relation to employment/unemployment in Bosnia and Herzegovina and Serbia, the following model was used for short- and long-term analysis:

$$GRUN_t = \beta_0 + \beta_1 GRLATA_t + \beta_2 GRTBA_t + \beta_3 GRTL_t + \beta_4 HHIasset_t + \beta_5 HHIcredit_t + \beta_6 HHIdeposits_t + \varepsilon_t \quad (2)$$

Where:
GRUN_t - unemployment rate in time *t*
GRLATA_t - the growth rate of liquid assets to total assets at time *t*
GRTBA_t - growth rate of total assets of commercial banks in time *t*
GRTL_t - the growth rate of total bank loans at time *t*
HHIasset_t - bank concentration of assets measured by the HHI index at time *t*
HHIcredit_t - bank concentration of loans measured by the HHI index at time *t*
HHIdeposits_t - bank concentration of deposits measured by the HHI index at time *t*
ε_t - regression residual at time *t*.

In order to test the statistical significance of previous variables, we used the generalized unit root test, i.e. Dickey-Fuller test with the breadth of origin and trend and without the breadth of origin and trend.

Tabela 6: Deskriptivna statistika zavisne i nezavisnih varijabli u modelu za period: 2008q1 - 2018q4

Indikatori deskriptivne statistike	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
Aritmetička sredina	516,19	27,43	23,35	15,85	1,62	1,63	1,67
Medijana	520,62	27,00	22,25	15,78	1,59	1,58	1,66
Maximum	554,93	34,90	30,96	19,48	1,82	1,96	1,88
Minimum	441,67	24,10	19,55	12,33	1,47	1,43	1,53
Standardna devijacija	31,68	2,48	3,03	1,78	0,10	0,15	0,11
Mera asimetrije	-0,765	0,74	0,98	0,25	0,38	0,72	0,30
Spljoštenost	2,72	3,13	3,00	2,27	1,87	2,48	1,79
Jargue - Bera	4,44	4,08	7,15	1,43	3,37	4,35	3,33
Probability	0,11	0,13	0,03	0,48	0,18	0,11	0,19
Broj opservacija	48	48	48	48	48	48	48

Izvor: Proračun autora

standardne devijacije na treću potenciju. Pri normalnoj distribuciji mera asimetrije iznosi 0, odnosno jednaka je verovatnoća da se ostvari negativni ili pozitivni prinos. U našem slučaju sve nezavisne varijable imale su nešto veću vrednost od nule i pozitivnu vrednost, izuzev stope nezaposlenosti koja je takođe zabeležila nešto veću vrednost od nule negativnog predznaka. Predznak (-) označava oštrij nagib i kratak rep distribucije na desnoj strani i blaži nagib i produženi rep distribucije na levoj strani. Za razliku od mere asimetrije, spljoštenost se definiše kao odnos četvrtog momenta oko sredine i standardne devijacije na četvrtu potenciju. Spljoštenost se u finansijama koristi za opisivanje ekstremnih događaja, odnosno onih događaja koji spadaju u sam rep distribucije. U slučaju normalne distribucije spljoštenost iznosi 3. Vrednost iznad 3 je jedino ostvarila stopa rasta likvidne aktive prema ukupnoj aktivi.

Tabela u nastavku teksta prikazuje rezultate

korelacione matrice između zavisne i nezavisnih varijabli.

Iz prethodne korelacione matrice se vidi da su najjaču korelacionu vezu (u kontekstu pozitivne jačine) sa zavisnom varijablom, tj. stopom rasta nezaposlenosti, ostvarile sledeće nezavisne varijable: indeks koncentracije aktive poslovnih banaka u BiH - HHI (0,656), zatim stopa rasta likvidne aktive prema ukupnoj aktivi - GRLATA (0,332). Ovaj rezultat je sasvim opravdan i logičan, jer sa povećanjem likvidne aktive banke racionališu u domenu odobravanja novih kredita prema različitim sektorima u privredi, što dovodi do menadžerske neefikasnosti koja se opravdava činjenicom da je proces selekcije dužnika u privredi BiH otežan zbog loših dužnika, a što dalje utiče delimično na zadržavanje postojećeg kadra, odnosno nezapošljavanja novih menadžera u bankarski sektor. U cilju rešavanja previsoke likvidnosti bankarskog sektora u Bosni i Hercegovini prvi korak je formiranje domaće institucije koja će

Tabela 7: Korelaciona matrica između zavisne i nezavisne varijable u modelu

	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
GRUN	1,000	-0,332	-0,502	-0,298	0,656	-0,527	-0,608
GRLATA	0,332	1,000	-0,439	-0,686	0,683	0,855	0,514
GRTBA	-0,502	-0,439	1,000	0,953	0,112	0,240	0,230
GRTL	-0,298	-0,686	0,953	1,000	-0,144	-0,479	0,004
HHIASSET	0,656	0,683	0,112	-0,144	1,000	0,909	0,889
HHICREDIT	-0,527	0,855	-0,240	-0,479	0,909	1,000	0,736
HHIDEPOSITS	-0,607	0,514	0,230	0,004	0,889	0,736	1,000

Izvor: Proračun autora

5.1. Research Results

5.1.1. Bosnia and Herzegovina

The highest value of the arithmetic mean was achieved at the unemployment rate of about 516%, followed by the growth rate of liquid assets to total assets of around 27%, the growth rates of banking assets of 23% and the growth rate of loans of about 16%. The greatest volatility in terms of the first-order statistical indicators, i.e. standard deviations also recorded an unemployment rate of about 32%, which is followed by the same trend as the arithmetic mean. The second place in terms of standard deviation was taken by the growth rate of banking assets (3.03%), and the third by the rate of growth of liquid assets (2.48%), and the growth rate of total loans of about 1.78%.

of the possible solutions for the activation of banking placements is the establishment of a domestic institution that would award ratings to the most successful companies and monitor their effectiveness and efficiency. Thus, the excess liquidity of banks would be relieved and the banks' confidence in one part of the real sector of Bosnia and Herzegovina increased. One of the more precise measurements of volatility, i.e. skewness, can be defined as the ratio of the third point around the middle and the standard deviation to the third potency. In a normal distribution, the skewness is 0, i.e., the likelihood of a negative or positive yield is equal. In our case, all independent variables had a slightly higher value than zero and a positive value, except for the unemployment rate, which recorded a slightly higher value than zero of the negative sign. The

Table 6: Descriptive statistics of dependent and independent variables in the model for the period 2008q1 - 2018q4

Indicators of descriptive statistics	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
Mean	516.19	27.43	23.35	15.85	1.62	1.63	1.67
Median	520.62	27.00	22.25	15.78	1.59	1.58	1.66
Maximum	554.93	34.90	30.96	19.48	1.82	1.96	1.88
Minimum	441.67	24.10	19.55	12.33	1.47	1.43	1.53
Standard deviation	31.68	2.48	3.03	1.78	0.10	0.15	0.11
Skewness	-0.765	0.74	0.98	0.25	0.38	0.72	0.30
Kurtosis	2.72	3.13	3.00	2.27	1.87	2.48	1.79
Jargue – Bera	4.44	4.08	7.15	1.43	3.37	4.35	3.33
Probability	0.11	0.13	0.03	0.48	0.18	0.11	0.19
Number of observations	48	48	48	48	48	48	48

Source: Calculation by the author

The share of liquid assets to the total assets of banks in Bosnia and Herzegovina reached its maximum value of about 41% in 2007, while in 2013, liquid assets to total assets amounted to around 19% and in 2018 to around 29%. It is evident that commercial banks in BH are more than liquid, where, due to the lack of quality projects and investments, they rationalize their placements on the one hand, and hold inactive liquid assets on the other hand. This is one of the main reasons of the slow economic growth and development, as well as employment. One

sign (-) signifies a sharper tail and a short tail distribution on the right-hand side and alleviates the slope and prolonged tail distribution on the left side. Unlike skewness, kurtosis is defined as the fourth-point ratio around the middle and the standard deviation to the fourth potency. Fluctuations in finance are used to describe extreme events, that is, those events that fall within the distribution. In the case of normal distribution, kurtosis equals 3. The value above 3 has only been recorded by the growth rate of liquid assets relative to total assets.

davati kreditne rejtinge najboljim preduzećima na osnovu analize svih indikatora poslovanja, te transparentnosti poslovanja. Posmatrano sa druge strane, najjača negativna kauzalnost je zabeležena kod sledećih nezavisnih varijabli: indeks koncentracije depozita (-0,607), indeks koncentracije kredita (-0,527), kao i stopa rasta aktive poslovnih banaka u BiH (-0,502). Sve tri nezavisne varijable su međuzobno uslovljene jer sa povećanjem aktive kao i depozita stvara se osnova za veću kreditnu ekspanziju koja konsekventno vodi do povećanja broja uposlenih u bankama, te delimično do smanjenja stope nezaposlenosti i indirektno na povećanje stope zaposlenosti pojedinih preduzeća iz realnog sektora preko povećane distribucije kredita. Potrebno je napomenuti da je distribucija plasmana po granama delatnosti nesrazmerna. Ilustracije radi, koncentracija kredita po privrednim granama u Republici Srpskoj u trećem kvartalu 2017. godine pokazuje u kontinuitetu koncentraciju kredita u proizvodnom sektoru oko 15%, u trgovini oko 13%, prema sektoru Vlade i institucija Vlade oko 12%, građevinski sektor samo 4%, ugostiteljstvo samo 1%, krediti za opštu potrošnju 31%, krediti za stambene potrebe oko 11% i preostali iznos od 13% (čine krediti za poljoprivredu od samo 2%, finansijsko posredovanje, poslovanje nekretninama, iznajmljivanje, poslovne usluge i ostalo). Najznačajniji broj zaposlenih lica na kraju 2017. godine odnosio se na sledeće grane delatnosti: oblast industrijske proizvodnje (posebno prerađivačka industrija), trgovina i hotelijerstvo. Tabela prikazuje rezultate stacionarnosti zavisne i nezavisnih varijabli po osnovu Dickey-Fuller-ovog testa (ADF) za prvu diferenciju².

Rezultati ispitivanja stacioniranosti su pokazali da je većina varijabli u modelu stacioniranog tipa, izuzev serija sledećih simbola: GRLATA, HHIASSET i GRTL. Tabela

9 ilustruje rezultate ekonometrijske analize između stope rasta nezaposlenosti u Bosni i Hercegovini, kao zavisne varijable, i sledećih nezavisnih varijabli: stope rasta likvidne aktive prema ukupnoj aktivi, stope rasta ukupne bankarske aktive, stope rasta ukupnih kredita, indeksa koncentracije - HHI za kredite, depozite

Tabela 8: Rezultati Dickey-Fuller testa bez širine porekla i trenda

Varijabla	t-static	Possibility value	Rezultat
GRLATA	-2,265	0,187	Nestacionirana
GRUN	-3,178	0,028	Stacionirana
HHIASSET	-1,376	0,855	Nestacionirana
HHICREDIT	-7,131	0,001	Stacionirana
HHIDEPOSITS	-6,721	0,001	Stacionirana
GRTBA	-4,414	0,005	Stacionirana
GRTL	-2,785	0,209	Nestacionirana

Izvor: Proračun autora

i aktivu. Ukupan broj posmatranih opservacija u modelu je 48. Koeficijent korelacije između zavisne i nezavisnih varijabli iznosi 0,73, dok je prilagođeni koeficijent korelacije 0,70. Dakle, radi se o srednje jakoj korelaciji.

Kao najsignifikantnije varijable su se pokazale sledeće: GRTBA i HHICREDIT. I jedna i druga nezavisna varijabla imaju negativan predznak, što znači da sa povećanjem stope rasta ukupne bankarske aktive, kao i sa povećanjem koncetracije kredita merene putem HHI indeksa, uz ostale nepromenjene uslove dolazi do smanjenja stope nezaposlenosti za pojedine grane delatnosti. Dakle, povećanje stope rasta bankarske aktive za jednu jedinicu uz konstantne ostale faktore konsekventno vodi do smanjenja stope nezaposlenosti za oko 10,83 jedinica. Jači uticaj na smanjenje stope nezaposlenosti na osnovu osnovnog ekonometrijskog modela je ostvario HHI indeks koncentracije u pogledu plasmana kredita. Dakle, povećanje HHI za kredite za jednu jedinicu, uz ostale nepromenjene faktore, vodi do smanjenja stope nezaposlenosti za oko 282 jedinice. Od prvog kvartala 2008. godine do četvrtog kvartala 2018. godine aktiva poslovnih banaka u BiH je povećana za oko 58%. Takođe, i učešće kapitala je imalo trend rasta s obzirom

2 Stacioniranost se odnosi na konstantnost serije podataka tokom vremena, u prvom redu kroz statističke mere: srednje vrednosti i varijanse.

The table below shows the results of the correlation matrix between dependent and independent variables.

on the basis of the analysis of all business indicators and business transparency. On the other hand, the strongest negative causality

Table 7: Correlation matrix between dependent and independent variables in the model

	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
GRUN	1.000	-0.332	-0.502	-0.298	0.656	-0.527	-0.608
GRLATA	0.332	1.000	-0.439	-0.686	0.683	0.855	0.514
GRTBA	-0.502	-0.439	1.000	0.953	0.112	0.240	0.230
GRTL	-0.298	-0.686	0.953	1.000	-0.144	-0.479	0.004
HHIASSET	0.656	0.683	0.112	-0.144	1.000	0.909	0.889
HHICREDIT	-0.527	0.855	-0.240	-0.479	0.909	1.000	0.736
HHIDEPOSITS	-0.607	0.514	0.230	0.004	0.889	0.736	1.000

Source: Calculation by the author

From the previous correlation matrix, it can be seen that the strongest correlation (in terms of positive strength) with the dependent variable, i.e. the growth rate of unemployment was achieved with the following independent variables: the index of concentration of commercial bank assets in BH - HHI (0.656), and the growth rate of liquid assets according to total assets - GRLATA (0.332). This result is completely justified and logical, as with the increase in their liquid assets the banks rationalize in the domain of granting new loans to different sectors in the economy, which leads to managerial inefficiency. This is, in turn, justified by the fact that the process of selecting debtors in the BH economy is hampered by bad debtors, which further partially affects the retention of the existing staff, i.e. the lack of employing new managers in the banking sector.

was recorded in the following independent variables: the HHI in terms of deposits (-0.607), the HHI in terms of credit (-0.527), and the growth rate of the commercial bank assets in Bosnia and Herzegovina (-0.502). All three independent variables are interdependent, as the increase in assets and deposits is the basis for greater credit expansion, which consequently leads to an increase in the number of employees in banks and partly to a reduction in the unemployment rate and indirectly to an increase in the employment rate of individual companies from the real sector through increased distribution lines. It should be noted that the distribution of loans according to the branches of activity is disproportionate. For the sake of illustration, the concentration of loans by business sector in the Republic of Srpska in the third quarter of 2017 indicates the continuity

Table 8: The results of the Dickey-Fuller test without the breadth of origin and trend

Variable	t-static	Possibility value	Result
GRLATA	-2.265	0.187	Non-static
GRUN	-3.178	0.028	Static
HHIASSET	-1.376	0.855	Non-static
HHICREDIT	-7.131	0.001	Static
HHIDEPOSITS	-6.721	0.001	Static
GRTBA	-4.414	0.005	Static
GRTL	-2.785	0.209	Non-static

Source: Calculation by the author

In order to solve the excessive liquidity of the banking sector in Bosnia and Herzegovina, the first step is to form a domestic institution that will give credit ratings to the best companies

number of employees at the end of 2017 related to the following branches of activity: the field of industrial production (especially the manufacturing industry), trade and hotel

of the loan concentration in the manufacturing sector at about 15%, in trade at about 13%, in the sector of the Government and government institutions at about 12%, in the construction sector at only 4%, catering only 1%, loans for general consumption 31%, housing loans 11% and the remaining 13% (accounted for by agricultural loans with 2%, financial intermediation, real estate, rental, business services, etc.). The most significant

Tabela 9: Osnovni regresioni model

Zavisna varijabla: GRUN
Metod: Najmanjih kvadrata
Datum: 03/28/19 Vreme: 17:56
Uzorak: 1 48
Broj uključenih opservacija: 48

Variabla	Koeficijent	Standardna greška	t-Statistika	Verovatnoća
C	804,3090	206,0225	3,903986	0,0003
GRLATA	0,319300	4,603167	0,069365	0,9450
GRTBA	-10,83002	12,84312	-0,843255	0,0440
GRTL	-3,694930	22,18619	0,166542	0,8685
HHIASSET	238,8209	132,2063	1,806426	0,0782
HHICREDIT	-282,4395	88,46283	-3,192748	0,0027
HHIDEPOSITS	-9,361688	52,08631	-0,179734	0,8582
Koeficijent determinacije	0,736455	Mean dependent var		516,8238
Prilagođeni koeficijent determinacije	0,697888	S.D. dependent var		30,42773
S.E. of regression	16,72452	Akaike info criterion		8,605666
Sum squared resid	11.468,09	Schwarz criterion		8,878550
Log likelihood	-199,5360	Hannan-Quinn criter.		8,708789
F-statistic	19,09524	Durbin-Watson stat		0,416313
Prob(F-statistic)	0,000000			

Izvor: Proračun autora

na činjenicu da su 2002. i naredne godine bile godine intenzivnijeg ulaganja kapitala u bankarske institucije, te godine privatizacije i formiranja novih banaka. Ako posmatramo kredite, relativni rast ukupnih kredita u poslednjem kvartalu 2018. godine je bio za oko 57% veći u odnosu na prvi kvartal 2008. godine, i samo 5,7% veći u odnosu na poslednji kvartal 2017. godine. S druge strane, kao najmanje

značajne varijable u modelu pokazale su se stopa rasta likvidne aktive prema ukupnoj aktivi, kao i HHI indeks u pogledu aktive. Povećanje stope rasta likvidne aktive prema ukupnoj aktivi za jednu jedinicu uz konstantne ostale faktore dovodi do povećanja stope nezaposlenosti za oko 0,32 jedinice. Visok procenat novčanih sredstava banaka predstavlja neplasirana sredstva komercijalnih banaka. Uglavnom, veći deo tih sredstava je u obliku deviznih depozita koji se drže u inostranstvu

na računima stranih banaka beskamato ili uz vrlo nisku kamatu.

5.1.2. Srbija

Kretanje vrednosti aritmetičke sredine je fluktuirajućeg karaktera u kontekstu posmatranih varijabli. Najveća vrednost aritmetičke sredine je zabeležena kod stope rasta bankarske aktive, zatim kod stope rasta

Tabela 10: Deskriptivna statistika zavisne i nezavisnih varijabli u modelu

Indikatori deskriptivne statistike	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
Aritmetička sredina	827.138,6	730.993,6	2.754.930,0	1.666.335,0	723,097	714,585	774,63
Medijana	834.217,0	735.991,0	2.855.200,0	1.710.300,0	716,00	733,00	768,00
Maximum	912.293,0	740.749,0	3.563.336,0	2.178.170,0	816,00	793,00	835,00
Minimum	655.505,0	704.552,0	1.615.443,0	831.706,0	617,00	593,00	696,00
Standardna devijacija	61.667,73	12.571,30	534.288,90	345.182,6	78,21	58,65	50,22
Mera asimetrije	-1,214	-1,522	-0,664	-0,845	-0,039	-0,502	-0,108
Spljoštenost	4,221	3,420	2,606	3,207	1,228	2,041	1,281
Jargue – Bera	12,940	16,529	3,283	4,954	5,372	3,294	5,124
Verovatnoća	0,001	0,002	0,193	0,083	0,068	0,192	0,07
Broj opservacija	48	48	48	48	48	48	48

Izvor: Proračun autora

industry. The table shows the stationary and dependence variability of the Dickey-Fuller test (ADF) for the first difference.²

The results of the stationary test showed that most of the variables are in the model of a stationary type, except for the series of the following symbols: GRLATA, HHIASSET, and GRTL. Table 9 illustrates the results of the econometric analysis between the unemployment rate in Bosnia and Herzegovina as dependent variables and the following independent variables: growth rates of liquid assets relative to total assets, growth rates of total banking assets, growth rates of total loans, concentration index - HHI for loans, deposits and assets. The total number of observed observations in the model is 48. The correlation coefficient between dependent and independent

independent variables have a negative sign, which means that the increase in the growth rate of total banking assets, as well as the increase in the concentration of loans measured by the HHI index with other unchanged conditions, are followed by a decrease in the unemployment rate for certain branches of business.

Therefore, with the increase in the rate of growth of banking assets for one unit, with other factors unchanged, there is a consequent decrease in the unemployment rate by about 10.83 units. A stronger impact on the reduction of the unemployment rate based on the basic econometric model was achieved by the HHI concentration index in terms of loan placement. Therefore, with the increase in HHI for loans for one unit, with other factors unchanged, the unemployment rate is reduced by about

282 units. From the first quarter of 2008 to the fourth quarter of 2018, the assets of commercial banks in BH increased by about 58%. Also, capital participation recorded a trend of growth given the fact that 2002 and the following years were the years of more intensive capital investment in banking institutions, as well as the year of privatization and formation of new banks. If we observe loans, the relative growth of total loans in the last quarter of 2018 was by about 57% higher than in the first quarter of 2008, and

only by 5.7% higher than in the last quarter of 2017. On the other hand, the least significant variables in the model turned out to be the growth rate of liquid assets to total assets, as well as the HHI index in terms of assets. With

Table 9: Basic regression model

Dependent Variable: GRUN
Method: Least Squares
Date: 03/28/19 Time: 17:56
Sample: 1 48
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	804.3090	206.0225	3.903986	0.0003
GRLATA	0.319300	4.603167	0.069365	0.9450
GRTBA	-10.83002	12.84312	-0.843255	0.0440
GRTL	-3.694930	22.18619	0.166542	0.8685
HHIASSET	238.8209	132.2063	1.806426	0.0782
HHICREDIT	-282.4395	88.46283	-3.192748	0.0027
HHIDEPOSITS	-9.361688	52.08631	-0.179734	0.8582
R-squared	0.736455	Mean dependent var		516.8238
Adjusted R-squared	0.697888	S.D. dependent var		30.42773
S.E. of regression	16.72452	Akaike info criterion		8.605666
Sum squared resid	11468.09	Schwarz criterion		8.878550
Log likelihood	-199.5360	Hannan-Quinn criter.		8.708789
F-statistic	19.09524	Durbin-Watson stat		0.416313
Prob(F-statistic)	0.000000			

Source: Calculation by the author

variables is 0.73, while the adjusted correlation coefficient is 0.70. Therefore, this is a medium strong correlation.

The most significant variables have shown the following: GRTBA and HHICREDIT. Both

2 Stationarity refers to the constancy of a series of data over time, primarily through statistical measures: mean values and variances.

ukupnih kredita, stope rasta nezaposlenosti, te stope rasta likvidne aktive prema ukupnoj aktivi. Najveću volatilnost u pogledu statističkih merila prvog reda, tj. standardne devijacije je isto zabeležila stopa rasta bankarske aktive, što prati isti trend kao i aritmetička sredina. Drugo mesto u kontekstu standardne devijacije pripada stopi rasta ukupnih kredita, zatim stopi rasta nezaposlenosti, te stopi rasta likvidne aktive prema ukupnoj aktivi (tabela br. 10).

Od posmatranih statističkih merila drugog reda mera asimetrija je za sve posmatrane varijable imala negativni predznak, gde predznak (-) ispred varijable označava oštrij nagib i kratak rep distribucije na desnoj strani, i blaži nagib i produženi rep na levoj strani distribucije. Najveće vrednosti spljoštenosti ostvarile su stopa rasta nezaposlenosti od 4,22 i stopa rasta likvidne aktive prema ukupnoj aktivi od 3,42. U slučaju normalne distribucije spljoštenost iznosi 3. Tabela 11. prikazuje dobijene rezultate Dickey-Fuller testa.

Tabela 11: Rezultati Dickey-Fuller testa bez širine porekla i trenda

Varijabla	t-static	Possibility value	Rezultat
GRLATA	-3,088	0,0353	Stacionirana
GRUN	-6,011	0,0000	Stacionirana
HHIASSET	-0,605	0,8587	Nestacionirana
HHICREDIT	-6,249	0,0000	Stacionirana
HHIDEPOSITS	-6,671	0,000	Stacionirana
GRTBA	-4,814	0,0004	Stacionirana
GRTL	-2,922	0,0523	Stacionirana

Izvor: Proračun autora

Rezultati ispitivanja stacioniranosti su pokazali da je većina varijabli u modelu stacioniranog tipa, osim indeksa koncentracije HHI u pogledu aktive. Tabela u nastavku teksta

pokazuje korelacionu međuzavisnost između zavisne i nezavisnih varijabli u modelu.

Prema rezultatima korelacione analize nezavisne varijable koje su imale najjači uticaj na smanjenje stope nezaposlenosti su sledeće: stopa rasta ukupnih kredita (-0,339), stopa rasta ukupne bankarske aktive (-0,291), te koncentracija depozita (-0,235). S druge strane, varijable koje su imale pozitivan smer sa stopom nezaposlenosti su u prvom redu stopa rasta likvidne aktive prema ukupnoj aktivi (0,100), kao i HHI indeks u pogledu aktive. Svakako da povećanje kvalitetne bankarske aktive predstavlja osnov plasiranja kreditnih plasmana, održivog rasta i finansijske stabilnosti. Od prvog kvartala 2008. godine pa do četvrtog kvartala 2018. godine aktiva banaka Republike Srbije je povećana za oko 120%. Rezultati ukupno predstavljenog regresionog modela imaju relativno zadovoljavajuće karakteristike. Dobijeni koeficijent determinacije $R^2 = 50,61$, što indicira da je prosto 51%

kretanja zavisne varijable objašnjeno modelom. Prilagođeni koeficijent determinacije iznosi 41,89%. Ukupan broj opservacija uključenih u model je 48.

Kao najznačajnije nezavisne varijable u pogledu uticaja na zavisnu varijablu su se pokazale sledeće: HHI u pogledu kredita (-411,13%), HHI u pogledu depozita (-172,62), stopa rasta kredita (-0,17%), te stopa rasta ukupne bankarske aktive (-0,06). S druge strane, dve nezavisne varijable

koje su imale isti smer kretanja kao stopa nezaposlenosti su stopa rasta likvidne aktive prema ukupnoj aktivi (4,92%), kao i indeks HHI u pogledu aktive (20,04%). Najveća

Tabela 12: Korelaciona matrica između zavisne i nezavisne varijable u modelu

	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
GRUN	1,000	0,100	-0,291	-0,338	-0,242	-0,143	-0,235
GRLATA	0,100	1,000	0,762	0,786	0,498	0,626	0,404
GRTBA	-0,291	0,762	1,000	0,958	0,861	0,890	0,783
GRTL	-0,339	0,786	0,958	1,000	0,733	0,779	0,660
HHIASSET	0,242	0,498	0,861	0,733	1,000	0,876	0,972
HHICREDIT	-0,143	0,626	0,890	0,779	0,876	1,000	0,830
HHIDEPOSITS	-0,235	0,404	0,783	0,660	0,972	0,830	1,000

Izvor: Proračun autora

the increase in the growth rate of liquid assets to the total assets for one unit, with other factors unchanged, the unemployment rate increased by about 0.32 units. A high percentage of the banks' monetary assets are non-granted funds of commercial banks. Basically, most of these funds are in the form of foreign currency deposits held abroad on accounts of foreign banks with no interest or with very low interest.

5.1.2. Serbia

The movement of the arithmetic mean is of a fluctuating character in the context of the observed variables. The highest value of the

standard deviation also recorded the growth rate of banking assets, which follows the same trend as the arithmetic mean. The second place in the context of standard deviation was taken by the growth rates of total loans, then the rate of unemployment and the growth rate of liquid assets to total assets (Table 10).

Among the second-order statistical criteria, skewness had a negative sign for all observed variables, with the sign (-) in front of the variable signifying a sharper tilt and a short distribution tail on the right side, along with the slighter slope and extended tail on the left side of the distribution. The highest values of

Table 10: Descriptive statistics of dependent and independent variables in the model

Indicators of descriptive statistics	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
Mean	827,138.6	730,993.6	2,754,930.0	1,666,335.0	723.097	714.585	774.63
Median	834,217.0	735,991.0	2,855,200.0	1,710,300.0	716.00	733.00	768.00
Maximum	912,293.0	740,749.0	3,563,336.0	2,178,170.0	816.00	793.00	835.00
Minimum	655,505.0	704,552.0	1,615,443.0	831,706.0	617.00	593.00	696.00
Standard deviation	61,667.73	12,571.30	534,288.90	345,182.6	78.21	58.65	50.22
Skewness	-1.214	-1.522	-0.664	-0.845	-0.039	-0.502	-0.108
Kurtosis	4.221	3.420	2.606	3.207	1.228	2.041	1.281
Jargue – Bera	12.940	16.529	3.283	4.954	5.372	3.294	5.124
Probability	0.001	0.002	0.193	0.083	0.068	0.192	0.07
Number of observations	48	48	48	48	48	48	48

Source: Calculation by the author

arithmetic mean was recorded in respect of the rate of growth of banking assets, then the growth rate of total loans, the rate of unemployment growth, and the growth rate of liquid assets to total assets. The highest volatility in terms of first-order statistical indicators, i.e., the

kurtosis were reached by the unemployment rate of 4.22 and the growth rate of liquid assets to total assets of 3.42. In the case of the normal distribution, kurtosis is 3. Table 11 shows the results of the Dickey-Fuller test.

The results of the stationary test showed that most of the variables are in the model of a stationary type, except the HHI concentration index in terms of assets. The table below shows the correlation between the dependent and independent variables in the model.

According to the results of the correlation analysis, the independent variables that had the strongest impact on the reduction of the unemployment rate were the following: the growth rate of total

Table 11: The results of the Dickey-Fuller test without the breadth of origin and trend

Variable	t-static	Possibility value	Result
GRLATA	-3.088	0.0353	Static
GRUN	-6.011	0.0000	Static
HHIASSET	-0.605	0.8587	Non-static
HHICREDIT	-6.249	0.0000	Static
HHIDEPOSITS	-6.671	0.000	Static
GRTBA	-4.814	0.0004	Static
GRTL	-2.922	0.0523	Static

Source: Calculation by the author

Tabela 13: Osnovni regresioni model

Zavisna varijabla: GRUN
Metod: Najmanjih kvadrata
Datum: 04/13/19 Vreme: 21:00
Uzorak: 1 44
Broj uključenih opservacija: 48

Variabla	Koeficijent	Standardna greška	t-Statistika	Verovatnoća
C	-2.715.427	808.434,3	-3,358872	0,0019
GRLATA	4,925233	1,057951	4,655446	0,0000
GRTBA	-0,065781	0,123277	-0,533602	0,5971
GRTL	-0,173097	0,121613	-1,423343	0,1637
HHIASSET	20,04635	694,5080	0,028864	0,9771
HHICREDIT	-411,1260	364,3427	-1,128405	0,2670
HHIDEPOSITS	-172,6183	810,2173	0,213052	0,8326
Koeficijent determinacije	0,506112	Mean dependent var		827.059,3
Prilagođeni koeficijent determinacije	0,418955	S.D. dependent var		62.431,65
S.E. of regression	47.589,35	Akaike info criterion		24,53286
Sum squared resid	7.70E+10	Schwarz criterion		24,82542
Log likelihood	-495.9236	Hannan-Quinn criter.		24,63939
F-statistic	5,806912	Durbin-Watson stat		0,808994
Prob (F-statistic)	0,000302			

Izvor: Proračun autora

strukturalna distribucija kredita u 2018. godini, odnosila se na oblasti saobraćaja i komunikacija, prerađivačke industrije, te poslovanja sa nekretninama. Povećanje stope rasta likvidne aktive prema ukupnoj aktivi za jednu jedinicu uz konstantne ostale faktore konsekvntno vodi do povećanja stope nezaposlenosti za oko 4,92 jedinice. Za posmatrani analizirani period najveća stopa likvidne aktive prema ukupnoj aktivi banaka u Srbije je ostvarena u prvom kvartalu 2008. godine (36,93%), kao i u trećem kvartalu 2008. godine (36,01%). S druge strane, najniže vrednosti stope rasta likvidne aktive prema ukupnoj aktivi su ostvarene u drugom kvartalu 2017. godine (13,11%) i u prvom kvartalu iste godine od oko 13,31%. Bankarski sektor Srbije je izuzetno likvidan³, kao što je i bankarski sektor BiH. Međutim, pitanje koje se postavlja je: *Da li previsoka likvidnost, čak veća od zakonskog minimuma, može biti ograničavajući faktor daljeg privrednog rasta, strukturalnih promena i konstantnog rasta nezaposlenih osoba?* Poslovne banke u Bosni i Hercegovini odgovor traže u nepostojanju kvalitetnih investicionih projekata sa jedne strane, kao i loše platežne

sposobnosti dužnika. Ostale karakteristike performansi poslovnih banaka u Srbiji odnose se na varijabilnost ročnosti dospelih depozita, lošu naplatu kredita i lošu aktivu, ograničen priliv kapitala iz inostranstva, kao i nedostatak adekvatne regulacije i nerazvijenost finansijskih tržišta.

Zaključak

Prema teoriji koncentracionog uticaja na razvijenim finansijskim tržištima povećana koncentracija može uticati na stvaranje ambijenta za monopolski položaj gde banke određuju visoke kamatne stope, te se njihova efikasnost smanjuje u pogledu distribucije plasmana različitim privrednim granama. Takođe, povećana koncentracija kod poslovnih banaka ima uticaja na raspodelu resursa među različitim privrednim sektorima, pa je i stopa nezaposlenosti različita među privrednim sektorima. Koncentracija kod poslovnih banaka u BiH je uglavnom umerena sa tendencijom rasta, gde dominantni uticaj pripada segmentu od 3 do 5 najvećih banaka. Bankarski sektor

3 Poslovne banke u Srbiji su dužne da održavaju uži pokazatelj likvidnosti na nivou koji nije niži od 80% do kraja 2017. godine, a nakon 2017. godine na nivou koji nije niži od 100%.

Table 12: Correlation matrix between dependent and independent variables in the model

	GRUN	GRLATA	GRTBA	GRTL	HHIASSET	HHICREDIT	HHIDEPOSITS
GRUN	1.000	0.100	-0.291	-0.338	-0.242	-0.143	-0.235
GRLATA	0.100	1.000	0.762	0.786	0.498	0.626	0.404
GRTBA	-0.291	0.762	1.000	0.958	0.861	0.890	0.783
GRTL	-0.339	0.786	0.958	1.000	0.733	0.779	0.660
HHIASSET	0.242	0.498	0.861	0.733	1.000	0.876	0.972
HHICREDIT	-0.143	0.626	0.890	0.779	0.876	1.000	0.830
HHIDEPOSITS	-0.235	0.404	0.783	0.660	0.972	0.830	1.000

Source: Calculation by the author

loans (-0.339), the growth rate of total banking assets (-0.291) and the concentration in terms of deposits (-0.235). On the other hand, the variables that positively correlated with the unemployment rate included: the growth rate of liquid assets to total assets (0.100) and the HHI index in terms of assets. Of course, the increase of quality banking assets is the basis for the placement of loans, sustainable growth

The obtained coefficient of determination is $R^2 = 50.61$, which indicates that only 51% of the variance of the dependent variable is explained by the model. The adjusted coefficient of determination is 41.89%. The total number of observations included in the model is 48.

The most significant independent variables regarding the impact on the dependent variable were the following: HHI in terms of loans

Table 13: Basic regression model

Dependent Variable: GRUN
Method: Least Squares
Date: 04/13/19 Time: 21:00
Sample: 1 44
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2715427.	808434.3	-3.358872	0.0019
GRLATA	4.925233	1.057951	4.655446	0.0000
GRTBA	-0.065781	0.123277	-0.533602	0.5971
GRTL	-0.173097	0.121613	-1.423343	0.1637
HHIASSET	20.04635	694.5080	0.028864	0.9771
HHICREDIT	-411.1260	364.3427	-1.128405	0.2670
HHIDEPOSITS	-172.6183	810.2173	0.213052	0.8326
R-squared	0.506112	Mean dependent var		827059.3
Adjusted R-squared	0.418955	S.D. dependent var		62431.65
S.E. of regression	47589.35	Akaike info criterion		24.53286
Sum squared resid	7.70E+10	Schwarz criterion		24.82542
Log likelihood	-495.9236	Hannan-Quinn criter.		24.63939
F-statistic	5.806912	Durbin-Watson stat		0.808994
Prob (F-statistic)	0.000302			

Source: Calculation by the author

and financial stability. From the first quarter of 2008 to the fourth quarter of 2018, the assets of the banks of the Republic of Serbia increased by around 120%. The results of the total regression model presented are relatively satisfactory.

(-411.13%), HHI in terms of deposits (-172.62), the growth rate of loans (-0.17%), and growth rate of total banking assets (-0.06). On the other hand, two independent variables that correlated with the unemployment rate are

Republike Srbije odlikuje zadovoljavajući stepen konkurencije i niska koncentracija aktivnosti. Rezultati istraživanja ukazuju da je većina posmatranih varijabli prema ADF modelu stacioniranog tipa. Rezultati korelacione analize i osnovnog modela ukazuju da je najjača povezanost sa stopom rasta nezaposlenosti kao zavisne varijable ostvarena preko sledećih nezavisnih varijabli: HHI indeksa koncentracije kredita i depozita sa nesrazmernom distribucijom prema svim privrednim granama, zatim stope rasta kredita i stope rasta bankarske aktive. Nesrazmerna distribucija plasmana je pre svega posledica prisustva umerene do u nekim godinama prisutne koncentracije (slučaj: Bosne i Hercegovine) i neizvesnosti tj. rizičnosti investicionih projekata. S druge strane najslabija korelacija je zabeležena sa sledećim nezavisnim varijablama: stopom rasta likvidne aktive prema ukupnoj aktivi i HHI indeksom koncentracije aktive. Bankarski sektor Srbije i Bosne i Hercegovine je više nego likvidan, čije su stope adekvatnosti kapitala iznad zakonski propisanih minimuma. Takođe, rezultati osnovnog modela za slučaj Srbije pokazuju da su najjači uticaj na smanjenje stope nezaposlenosti ostvarili indeksi koncentracije

kredita, depozita i stopa rasta kredita, dok su isti smer sledile sledeće nezavisne varijable: stopa rasta likvidne aktive prema ukupnoj aktivi i HHI indeks u pogledu aktive.

Poslovne banke u Srbiji i Bosni i Hercegovini su imale skroman uticaj na povećanje zaposlenosti, bilo direktno kroz upošljavanje u sam finansijski sektor, ili indirektno putem kreditiranja realnog sektora na pokretanje novih biznisa. Međutim, u narednom periodu banke, pre svega u BiH, se trebaju fokusirati na kreditiranje rastućih grana delatnosti kroz oslobađanje visoke likvidnosti, a sve u cilju povećanja ekonomskog rasta i smanjenja nezaposlenosti. Dakle, taktično smanjenje likvidnosti u korist srazmernog povećanja plasmana prema rastućim privatnim sektorima može polučiti veću efektivnost i efikasnost koja će se u konačnici manifestovati na smanjenje stope nezaposlenosti.

Uspešan odgovor na turbulentno okruženje je prognoziranje performansi poslovnih banaka, te definisanje svih elemenata i instrumenata kojima se performanse mogu realizovati. Za dalja istraživanja bilo bi neophodno uzeti širi opseg internih i eksternih varijabli kao i još dužu raspoloživu vremensku seriju podataka.

the growth rate of liquid assets to total assets (4.92%) and the HHI in terms of assets (20.04%). The largest structural distribution of loans in 2018 was related to the area of transport and communications, manufacturing and real estate business. An increase in the growth rate of liquid assets to total assets for one unit, with other factors unchanged, leads to an increase in the unemployment rate of around 4.92 units. For the analyzed period, the largest liquid assets rate according to the total assets of banks in Serbia was achieved in the first quarter of 2008 (36.93%) and in the third quarter of 2008 (36.01%). On the other hand, the lowest values of the growth rate of liquid assets to total assets were realized in the second quarter of 2017 (13.11%) and in the first quarter of the same year, about 13.31%. The banking sector of Serbia is extremely liquid³, as is the banking sector in BH.

However, the following question arises: *Can the excessively high liquidity, higher even than the legal minimum, be a limiting factor for further economic growth, structural changes and steady growth of unemployed persons?* The business banks in Bosnia and Herzegovina are looking for an answer to the lack of quality investment projects, as well as the poor paying capacity of debtors. Other characteristics of the banking business performance in Serbia are related to the variable maturity of deposits, poor collection of loans and bad assets, limited capital inflows from abroad, the lack of adequate regulation and the underdevelopment of financial markets.

Conclusion

According to the theory of the concentrating influence on developed financial markets, increased concentration can affect the creation of a monopoly position where banks set high-interest rates, and their efficiency decreases with regard to the distribution of placements to different branches of the economy. Also, the increased concentration of commercial banks has an impact on the distribution of resources among the various economic sectors, so the unemployment rate is also different among

the economic sectors. The concentration of commercial banks in BH is largely moderated by the tendency of growth, the dominant influence belonging to the 3 to 5 largest banks. The banking sector of the Republic of Serbia is characterized by a satisfying degree of competition and a low concentration of activity.

The research results show that most of the observed variables are based on the stationary type ADF model. Correlation analysis and basic model results show that the strongest correlation with the growth rate of unemployment as dependent variables was achieved through the following independent variables: the HHI index of credit and deposit concentration with unbalanced distribution across all branches of the economy, then the rate of growth of loans and growth rates of banking assets. The unreasonable distribution of placements is primarily due to the presence of moderate concentration in some years (in the case of Bosnia and Herzegovina) and the uncertainty of investment projects. On the other hand, the weakest correlation was recorded with the following independent variables: the growth rate of liquid assets to total assets and the HHI concentration of assets. The banking sectors of Serbia and Bosnia and Herzegovina are more than liquid, their capital adequacy rates being above the legally prescribed minimum. Also, the results of the basic model for the case of Serbia show that the strongest influence on the reduction of the unemployment rate was achieved by the HHI index in terms of credit, deposits and credit growth rates, while the correlation occurred with the following independent variables: the growth rate of liquid assets to total assets and the HHI index in terms of assets.

Commercial banks in Serbia and Bosnia and Herzegovina had a modest impact on increasing employment either directly through employment in the financial sector, or indirectly by lending to the real sector to start up new businesses. However, in the forthcoming period, banks, above all in BH, should focus on lending to the growing branches of activity through the release of high liquidity, all in

3 Business banks in Serbia are obliged to maintain a lower liquidity indicator at a level not lower than 80% by the end of 2017 and after 2017 at a level not lower than 100%.

Literatura / References

1. Agencija za bankarstvo Federacije Bosne i Hercegovine (2002). Informacija o bankarskom sistemu Federacije Bosne i Hercegovine, stanje: 31.12.2002, preuzeto: https://www.fba.ba/images/documents_archive/publikacije_7_1.pdf
2. Agencija za bankarstvo Federacije Bosne i Hercegovine (2017). Informacija o subjektima bankarskog sistema Federacije Bosne i Hercegovine na dan. 31.12.2017. godine, preuzeto: https://www.fba.ba/images/Publikacije_Banke/informacija_o_subjektima_bank_sist_fbih_31_12_2017.pdf
3. Agencija za bankarstvo Republike Srpske (2002). Informacija o bankarskom sektoru Republike Srpske za period: 01.01-31.12.2002. godine, preuzeto: https://www.abrs.ba/public/data/documents/39/Informacija_o_bankarskom_sektoru_RS_31122002.pdf
4. Agencija za bankarstvo Republike Srpske (2017). Izvještaj o stanju u bankarskom sistemu Republike Srpske 01.01.2017-30.09.2017, preuzeto: https://www.abrs.ba/public/data/documents/1028/Izvjestaj_o_stanju_bankarskog_sistema_RS_30092017.pdf
5. Allen, F., Carletti, E., Marquez, R. (2011). Credit market competition and capital regulation. *Review of Financial Studies*, 24(4), pp. 983–1018.
6. Berger, A. N. (1995). The profit-structure relationship in banking—tests of market-power and efficient-structure hypotheses. *Journal of Money, Credit and Banking*, pp. 404–431.
7. Boyd, J. H., De Nicolo, G. (2005). The theory of bank risk taking and competition revisited. *The Journal of Finance*, 60(3), pp. 1329–1343.
8. Božović, J. (2013). Dynamics of Interest Margins in Transition Environment of Serbia, *Facta Universitatis*, Vol. 10, No. 4.
9. Claessens, S., Laeven, L. (2004). What Drives Bank Competition? Some International Evidence. *Journal of Money Credit and Banking*, No. 36, pp. 563–583.
10. Demsetz, H. (1973). Industry structure, market rivalry, and public policy. *Journal of Law and Economics*, pp. 1–9.
11. Direkcija za ekonomsko planiranje Bosne i Hercegovine (2017). Bosna i Hercegovina - Ekonomski trendovi. Godišnji izvještaj, preuzeto: http://www.dep.gov.ba/dep_publikacije/ekonomski_trendovi/Archive.aspx?langTag=bs-BA&template_id=140&pageIndex=1
12. <https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00203&plugin=1>
13. Morin, W., Nzomoi, J., Rutto, N. (2012). Assessing the impact of private sector credit on economic performance: Evidence from sectoral panel data for Kenya. *International Journal of Economics and Finance*, No. 4(3), pp. 182–190.
14. Narodna banka Srbije (2004). Bankarski sektor u Srbiji - Izveštaj za četvrti kvartal 2004. godine, preuzeto: https://www.nbs.rs/internet/latinica/55/55_4/kvartalni_izvestaj_IV_04.pdf
15. Narodna banka Srbije (2017). Bankarski sektor u Srbiji - Izveštaj za IV tromesečje 2017. godine, preuzeto: https://www.nbs.rs/internet/latinica/55/55_4/kvartalni_izvestaj_IV_17.pdf
16. Narodna banka Srbije (2017). Bankarski sektor u Srbiji - Izveštaj za IV tromesečje 2017. godine, preuzeto: https://www.nbs.rs/internet/latinica/55/55_4/kvartalni_izvestaj_IV_17.pdf
17. Narodna banka Srbije (2017). Godišnji izveštaj o monetarnoj politici, preuzeto: https://www.nbs.rs/internet/latinica/90/90_7/monetarna_politika_2017.pdf
18. Schaeck, K., Cihak, M., Wolfe, S. (2009). Are competitive banking systems more stable? *Journal of Money, Credit and Banking*, 41(4), pp. 711–734.

order to increase economic growth and reduce unemployment. Thus, the tactical reduction of liquidity in favor of a large increase in placements towards growing private sectors can result in greater effectiveness and efficiency, which will ultimately manifest as a reduction in the unemployment rate.

The successful response to a turbulent environment is forecasting the performance of business banks, and defining all the elements and instruments that performance can accomplish. For further research, it would be necessary to take a broader range of internal and external variables as well as an even longer data set.