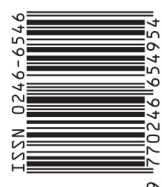


Udruženje banaka Srbije

BANKARSTVO

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SINERGIJA DOBRIH POLITIKA, TRŽIŠNIH KRETANJA I NAUKE ZA UBRZAN I ODRŽIV RAST

Dr Sladjana Sredojević
Urednik

U trenutku objavljivanja ovog broja časopisa Bankarstvo stižu dobre vesti o monetarnoj i makroekonomskoj politici. Inflacija proteklih meseci usporava brže od očekivanja, a nivo problematičnih kredita ostaje na istorijskom minimumu od 3%.

Sa daljim usporavanjem inflacije ona bi, po predviđanjima Narodne banke Srbije, od naredne godine trebalo da se zaustavi oko centralne vrednosti cilja od 3%. Inflatorna očekivanja prema novim anketama smanjena su i u privredi, i u finansijskom sektoru. Samim tim otvara se i pitanje ublažavanja monetarne politike. NBS se odlučila za oprezan pristup, sa zadržavanjem referentne kamatne stope na nepromenjenom nivou, kako ublažavanje ne bi bilo preuranjeno. Ubrzava se i ekonomska aktivnost i stoga NBS prognozira ostvarenje rasta bruto društvenog proizvoda od 3,5% u 2024. godini.

Očuvanu finansijsku stabilnost pokazuje i adekvatnost kapitala banaka. Banke posluju sa profitom, a na njihov sveukupni uspeh utiču i dalje procesi kapitalizacije kroz merđžere, odnosno akvizicije u bankarskom sektoru. Istraživanje objavljeno u ovom broju našeg časopisa na primerima određenog broja banaka koje posluju u Srbiji - AIK, OTP, Raiffeisen, NLB komercijalne banke i Poštanske štedionice - potvrđuje da spajanja rezultiraju rastom profitabilnosti, mada je rezultat poslovanja pod uticajem i brojnih drugih faktora makroekonomske prirode.

Kamatna stopa na bankarske kredite i devizni kurs domaće valute imaju negativan uticaj i na indeks cena nekretnina, pokazuje drugi članak u ovom broju Bankarstva. Najuočljiviji uticaj na indeks cena nekretnina ima indeks potrošačkih cena, pokazuju podaci.

Kakav je uticaj restriktivnosti monetarne politike na devizni kurs pokazano je na primeru Bosne i Hercegovine kroz članak koji identifikuje značajno odstupanje realnog efektivnog deviznog kursa konvertibilne marke u odnosu na ravnotežni nivo. Ovo je posebno uočljivo tokom perioda pandemije kovida i globalnog rasta inflacije.

IU ovom broju časopisa, posvećena je pažnja i ulozi zaposlenih, odnosno ljudskog kapitala kao činioca navedenih politika. Medjutim, nasuprot svetlim finansijskim pokazateljima, stanje i trendovi kretanja zaposlenih u bankama šalju indikativne znake upozorenja. istraživanje objavljeno u ovom broju govori da je emocionalna iscrpljenost postala sveprisutna pojava u bankarskom sektoru današnjice na svim meridijanima. Rezultati pokazuju statistički značajnu razliku u osećaju zaposlenih da previše rade u odnosu na godine radnog staža u bankama. Takođe se bitno razlikuju odgovori zaposlenih koji rade sa klijentima i onih zaposlenih koji nemaju direktan kontakt sa korisnicima bankarskih usluga.

Na osnovu ostvarenih makroekonomskih indikatora i stabilnosti finansijskog sistema, kao i objavljenih referentnih projekcija budućih kretanja, u nastavku godine uz sve izazove mogu se očekivati dobre perspektive za izvesnost poslovanja i održiv rast domaće ekonomije. S tim u skladu su i rezultati istraživanja različitih oblasti koje objavljujemo u ovom broju. Nastojaćemo da i u budućem periodu budemo otvoreni za razmene dostignuća i ukazivanja na trendove, mesto susreta nauke, profesije, tržišnih kretanja u regionalnom i međunarodnom kontekstu zahvaljujući posvećenim istraživačima i vama, našim dragim čitaocima!

Urednik

Dr Sladjana Sredojević



A SYNERGY OF GOOD POLITICS, MARKET FLOWS, AND SCIENCE FOR FAST AND SUSTAINABLE GROWTH

Slađana Sredojević, PhD
Editor

At the time of publication of this issue of Bankarstvo Journal, there is good news about monetary and macroeconomic policy. In recent months, inflation has been slowing down faster than expected, and the level of non-performing loans remains at a historic low of 3%.

With a further slowdown in inflation, and according to the predictions of the National Bank of Serbia, it should reach a stop around the central target value of 3%, as of the start of the following year. According to new surveys, inflationary expectations have decreased both in the economy and in the financial sector. With that, the question of softening the monetary policy arises. The NBS opted for a cautious approach, keeping the benchmark interest rate unchanged, so that the easing would not be premature. Economic activity is also accelerating, thus the NBS forecasts the realisation of GDP growth of 3.5% in 2024.

Preserved financial stability is also shown by the adequacy of banks' capital. Banks operate with a profit, and their overall success is influenced by further capitalisation processes, through mergers or acquisitions in the banking sector. The research published in this issue of our journal, on the examples of a certain number of banks operating in Serbia - AIK, OTP, Raiffeisen, NLB Komercijalna Bank and Postal Savings Bank - confirms that mergers result in increased profitability, although the result of operations is also influenced by numerous other macroeconomic factors.

The interest rate on bank loans and the exchange rate of the domestic currency both have a negative impact on the real estate price index as well, according to another article in this issue of Bankarstvo. The data show that the consumer price index has the most noticeable impact on the real estate price index.

The impact of the restrictiveness of the monetary policy on the exchange rate is shown on the example of Bosnia and Herzegovina in an article that identifies a significant deviation of the real effective exchange rate of the convertible mark in relation to the equilibrium level. This had been especially noticeable during the period of the covid pandemic and the global increase in inflation.

In this issue of our journal, attention is also paid to the role of employees, i.e., human capital as a factor in the aforementioned policies. However, in contrast to the bright financial indicators, the state and trends of bank employees are sending out indicative warning signs. Research published in this issue suggests that emotional exhaustion has become a ubiquitous phenomenon in today's banking sector on all meridians. The results show a statistically significant difference in employees' feeling that they work too much in relation to the years of service spent working in banks. There are also significant differences in the answers of employees who work with clients and those employees who do not have direct contact with bank service users.

Based on the achieved macroeconomic indicators and the stability of the financial system, as well as the published benchmark projections of future trends, in the rest of the year, despite all the challenges, we can expect good prospects for business certainty and sustainable growth of the domestic economy. The results of research in various areas, that we published in this issue, are in line with this. We will strive to be open for the exchange of achievements and pointing out trends in the future, providing a hub for science, expert opinions, and market trends in the regional and international context, with the help of our dedicated researchers and you, our dear readers!

Editor

Sladjana Sredojević, PhD

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KRETANJE REALNOG EFEKTIVNOG DEVIZNOG KURSA KONVERTIBILNE MARKE

Dr Dragan Jović

Diplomirani ekonomista,
Centralna banka Bosne i Hercegovine
dragan.jovic@cbbh.ba

Sažetak: U istraživanju smo ocijenili ravnotežni realni efektivni devizni kurs konvertibilne marke i identifikovali značajno odstupanje realnog efektivnog deviznog kursa konvertibilne marke u odnosu na ravnotežni nivo, posebno tokom perioda pandemije korona virusa i globalnog rasta inflacije. Tokom perioda globalno visoke inflacije glavne determinante apresijacije REER-a bile su brži rast BiH cijena od stranih cijena i sporiji rast produktivnosti u BiH u odnosu na okruženje, te u manjoj mjeri rast domaće realne kamatne stope i promjene u uslovima razmjene. Pored ovih apresijacijskih pritisaka, izražen je uticaj nepokrivenog pariteta kamatnih stopa na depresijaciju REER-a, zbog izuzetno restriktivne monetarne politike ECB i nižeg stepena restriktivnosti monetarne politike u BiH, sa aspekta visine strane i domaće kamatne stope. Volatilnost odstupanja REER-a od ravnotežnog REER veća je u kriznim periodima. Izolovane determinante REER-a konvertibilne marke pružaju dobru analitičku podlogu za kreiranje BiH monetarne politike i regulaciju bankarskog sektora.

Ključne reči: devizni kurs, devizni režim, monetarna politika, valutni odbor, fiksni devizni kurs, realni efektivni devizni kurs.

JEL klasifikacija: E52, F31

Uvod

Svaki režim deviznog kursa se sastoji od bilateralnih deviznih kurseva, koji određuju cijenu strane robe u domaćoj valuti i time najbitniji dio ekonomskih odnosa u razmjeni roba i usluga jedne države sa pojedinačnim državama ili valutnim područjima. Nominalni efektivni devizni kurs (NEER), kao polazni oblik multilateralnog deviznog kursa, daje informaciju o kretanju deviznog kursa zemlje u odnosu na glavne ili sve spoljnotrgovinske partnere, a kao ponderi se uzimaju udjeli u spoljnoj trgovini. Realni efektivni devizni kurs (REER) predstavlja NEER korigovan sa nekim cjenovnim efektom, jediničnim troškovima rada (eng. ULC) ili češće potrošačkim cijenama (CPI). Fiksni devizni kurs BiH valute u odnosu na evro (1 EUR = 1,955830 KM) ustanovljen 1997. godine znači da se većina ostalih deviznih kurseva konvertibilne marke (KM) u odnosu na zakonska sredstva plaćanja drugih država usklađuje sa promjenama u deviznom kursu EURKM. To BiH monetarnoj, i u širem smislu ekonomskoj politici, oduzima mogućnost prilagođavanja na spoljne šokove promjenom deviznog kursa, pa se teret prilagođavanja pomjera na potrošačke cijene, odnosno na REER u koje su one ugrađene. Zato je ekonomski koncept deviznog kursa uspostavljen kroz REER ključan za ocijenu položaja BiH u međunarodnoj podijeli rada.

Cilj nam je da modeliramo kretanje REER-a konvertibilne marke i da u okviru te ocijene odredimo ravnotežni REER ili EREER (eng. equilibrium real effective exchange rate), kao i da utvrdimo determinante REER-a. Pod ravnotežom u ovome istraživanju, po uzoru na (Feyzioglu, 1997), ne podrazumijevamo REER kojim se postiže unutrašnja i spoljna ekonomska ravnoteža, već dugoročni ravnotežni REER koji se formira pod uticajem glavnih, fundamentalnih, ekonomskih determinanti REER-a (Edwards, 1994). Mi pretpostavljamo da su iznadprosječan rast inflacije u BiH tokom 2022. godine kao i pad produktivnosti doveli do apresijacije REER-a, dok je izuzetno spor rast BiH kamatne stope u poređenju sa kamatnom stopom ECB djelovao na depresijaciju REER-a konvertibilne marke. Želimo i da potvrdimo pretpostavku da REER odstupa od dugoročnog ravnotežnog REER-a, posebno u kriznim periodima poput pandemije i ubrzanog rasta inflacije. S obzirom da se ocijena EREER vrši kroz prognozu REER unutar uzorka (eng. in sample) dodatni rezultat istraživanja je poređenje prognoze REER jedan period izvan uzorka (eng. out of sample). Zato smo postavili i dodatnu pretpostavku istraživanja u kojoj tvrdimo da kombinovana prognoza (eng. combining forecast) daje precizniju prognozu od individualnih prognoza tj. prognoza zasnovanih na jednoj metodologiji.

Istraživanje je planirano kako slijedi. Prvo dajemo kratki pregled referentne literature iz ove oblasti sa posebnim naglaskom na istraživanja koja su BiH autori sproveli na ovu ili granične teme, a u ovom dijelu istraživanja polemišemo i sa samim konceptom EREER. Nakon toga predstavljamo metodološku osnovu rada, opisujemo korištene podatke i dodatno objašnjavamo multilateralne devizne kurseve. Prikazivanje rezultata istraživanja i rasprava o njima su postavljeni u centralni dio rada, nakon čega slijedi zaključak u obliku sumarne rasprave koja se završava iznošenjem preporuka za kreatore ekonomskih politika i određivanjem budućih pravaca istraživanja ove teme.

Literarni pregled

Prvi i jedini, nama poznat, pokušaj modeliranja REER-a konvertibilne marke (Omerbegović, 2006) pomoću VECAM-a uključuje četiri varijable; otvorenost u tekućim cijenama ((izvoz + uvoz)/BDP), spoljnotrgovinski saldo u konstantnim cijenama ((izvoz – uvoz)/BDP), spoljni dug (servis spoljnog duga/izvoz) i vladinu potrošnju. Glavni nalaz ovoga istraživanja je da postoji značajno i trajno pozitivno odstupanje ravnotežnog REER (aproksimiran dugoročnom jednačinom REER) u odnosu na REER. Sljedeće istraživanje na temu deviznog kursa konvertibilne marke (Marić, 2012) istražuje nominalni devizni kurs, te zaključuje da režim valutnog odbora vodi ka sistemskoj apresijaciji domaće valute, koja proizvodi dugoročni deficit tekućeg računa. Do sličnog nalaza dolazi i do sada najjača kritika BiH valutnog odbora (Milojević, 2012) u kojem se ističe da je “valutni odbor gori od zlatnog standarda”, te da “umjesto platnobilansnog uravnoteženja teče proces uvećanja platnog deficita na osnovu neprekidnog uvećanja precijenjenosti valute”. U ovom istraživanju se procijenjuje da je ravnotežni devizni kurs EURKM 3 i da je potrebna depresijacija od 33% radi izjednačenja sa ravnotežnim nominalnim deviznim kursem EURKM. Oba ova istraživanja zahtijevaju depresijaciju konvertibilne marke zanemarujući visok stepen evrizacije BiH ekonomije, a propuštaju i da uoče da se u režimu fiksnog deviznog kursa prilagođavanje salda platnog bilansa vrši u mnogo širem kontekstu REER-a. Istražujući vrste deviznih režima grupa BiH autora (Vujanić, Žarković, & Gligorić, 2017) na uzorku od 10 tranzicionih zemalja (2010) pronalaze da je varijabilni devizni kurs, sa aspekta interne i eksterne neravnoteže, bolja opcija za razvijenije zemlje u tranziciji, ali ne i za manje razvijene zemlje u tranziciji, implicitno preporučujući održanje BiH valutnog odbora. U kontekstu odabrane teme istraživanja posebno je zanimljiv nalaz po kojem je realni devizni kurs konvertibilne marke bio podcijenjen za oko 2% u poređenju sa rastom produktivnosti u prvim godinama tranzicije (Čizmović, 2016). Na bazi prethodnih istraživanja dugoročnog ravnotežnog deviznog kursa (Edwards, 1994) razvijena je veza između deviznog kursa i fundamentalnih varijabli na primjeru Finske (Feyzioglu, 1997). U ovome pristupu nema potrebe za definisanje odgovarajućeg nivoa interne i eksterne neravnoteže, jer su one endogene u odnosu na sistem. U ovome istraživanju za formulisanje veze između REER i fundamentalnih varijabli u skraćenoj formi (eng. reduced form) korišteno je pet varijabli i za naše istraživanje ovo istraživanje je referentno. Autor je pronašao snažan uticaj svih odabranih varijabli (uslovi razmjene, diferencija u ostalim cijenama i produktivnosti, realna kamatna stopa i devijacija od nepokrivenog pariteta kamatnih stopa) na odstupanje od dugoročnog ravnotežnog deviznog kursa Finske u periodu od 1975. godine do 1995. godine. Na globalnom nivou, u odnosu na glavne svjetske valute (dolar, jen, marka) istraživane su determinante realnog deviznog kursa (MacDonald, 1997). U pogledu tvrdih valuta, koje čine najveći dio svjetskih deviznih rezervi, autor pronalazi da su ključne determinante ravnotežnih deviznih kurseva, fiskalni balans, neto strana aktiva i realna stopa štednje koje u jednačinu ulaze sa pozitivnim koeficijentom, dok realna cijena nafte i uslovi razmjene mogu imati i pozitivan i negativan parametar. Na uzorku azijskih zemalja (Jongwanich, 2009) u različitim vremenskim periodima, uz primjenu kointegracione tehnike i ukupno 6 varijabli (vladina potrošnja u odnosu na trgovački sektor, vladina potrošnja u odnosu na netr trgovački sektor, neto strana aktiva, produktivnost, uslovi razmjene i otvorenost ekonomije) zabilježeno je značajno odstupanje od ravnotežnog REER. U ovom istraživanju, što je vrlo bitno i za BiH, je pronađeno da uslovi razmjene, definisani kao odnos izvoznih i uvoznih cijena mogu imati koeficijent i pozitivnog i negativnog predznaka u jednačini REER. Istraživanje na argentinskoj ekonomiji (Coppola, Lagerborg, & Mustafaoglu, 2017) na bazi četiri ključne varijable (uslovi razmjene, razlika u produktivnosti, devizne rezerve i trgovačka otvorenost) otkrilo je visoku precijenjenost argentinske valute u periodu od 1980. godine do 2015. godine.

Metodologija, podaci i transformacija podataka

Glavne metodološke alatke istraživanja su vektorski autoregresioni model (VAR), višestruki linearni regresioni model (MRM) i deskriptivna statistika. U određivanju poželjnog VAR modela za ocijenu i prognozu EREER upotrijebili smo standardnu proceduru. Prvo smo ispitali postojanje jediničnog korijena $I(1)$ umetnutim Dickey – Fullerovim testom (eng. Augmented Dicky Fuller test, ADF test), a zatim je konstruisan VAR u nivou i određen optimalan broj vremenskih pomaka u varijablama pomoću informacionih kriterija (Akaike information criterion (AIC), Hannan-Quinn information criterion (HQ), Final prediction error (FPE) sequential modified LR test statistic (LR). Ako su varijable u modelu $I(1)$, a ne stacionarne $I(0)$ VAR mora biti zamjenjen sa VAR sa korigovanim greškom (eng. error correction), koja nastaje zbog kratkoročnog odstupanja od dugoročnog trenda. VECM (eng. vector error correction model) ima za jedan manji broj vremenskih pomaka nego VAR u nivou na osnovu kojeg je konstruisan, a rang VECAM-a kojim se određuje broj kointegracionih jednačina dobija se Johansonovim testom kointegracije (nerestriktivni test kointegracije ranga - maksimalna ajgen vrijednost).

Pretpostavke u vezi reziduala u VAR i VECAM modelu testirali smo na autokorelaciju (Q- stat), serijsku korelaciju (Breusch-Pagan LM test) homoskedastičnost (Breusch-Pagan-Godfrey test) i normalan raspored reziduala (Jarque-Bera test), a stabilnost VAR modela pomoću ajgen vrijednosti kompanion matrice.

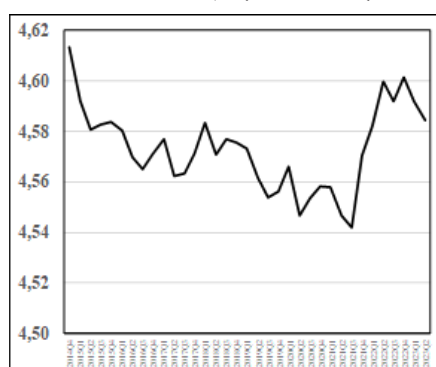
Sve varijable su na kvartalnom nivou, a uzorak na osnovu kojega su ocijenjeni modeli obuhvata period od Q1 2014 do Q1 2023. godine. U skladu sa (Feyzioglu, 1997) odabrali smo pet fundamentalnih varijabli (Tabela 1 i grafikoni 1-6) za konstrukciju VAR modela; uslovi razmjene (eng. terms of trade), domaća kamatna stopa, razlika u produktivnosti, razlika u ostalim cijenama, odstupanje od nepokrivenog pariteta kamatnih stopa. Pošto su devizni kursevi u REER konvertibilne marke definisani direktnom notacijom (npr. 1 KM = 0,51 EUR) i odnosom BiH CPI i stranog CPI, uslovi razmjene su određeni kao odnos indeksa BiH cijena izvoza i indeksa BiH cijena uvoza (2015 = 100). Domaća (BiH) kamatna stopa je naknada na sredstva iznad obavezne rezerve banaka kod CBBiH ili na višak rezervi (eng. deposit facility rate). Produktivnost je računata kao realni BDP po zaposlenom ponderisan sa učešćem svakog BiH spoljnotrgovinskog partnera u BiH spoljnotrgovinskoj razmjeni. Prosječna ponderisana vrijednost produktivnosti zemalja koje trguju sa BiH stavljena u odnos sa nivoom produktivnosti u BiH (realni BDP u odnosu na broj zaposlenih) daje razliku u produktivnosti. I CPI BiH spoljnotrgovinskih partnera računat je kao ponderisani prosjek (ponderi su udjeli u spoljnotrgovinskoj razmjeni) pri čemu se razlika u ostalim cijenama (pothdif) dobije kao količnik BiH CPI i stranog CPI. Teorija odnosa (pariteta) kamatnih stopa smatra da razlika u kamatnim stopama među zemljama mora dovesti do depresijacije valute zemlje koja ima višu kamatnu stopu, odnosno do apresijacije valute zemlje koja ima nižu kamatnu stopu i da zato nije moguća stalna arbitraža kamatnih stopa u obliku ulaganja investitora iz zemlje sa nižom kamatnom stopom u zemlju sa višom kamatnom stopom (eng. carry trade). U borbi dvije teorije kamatnih stopa (Krušković, 2014, str. 281) u BiH se ispravnom pokazala treća teorija kojoj je i pored fiksnog deviznog kursa i BiH hroničnog deficita tekućeg računa referentna kamatna stopa BiH niža nego u zemljama rezervne valute (evrozona). Investitori iz BiH zbog nepokrivenog pariteta kupovne moći (eng. uncovered interest rate parity, UIP), koji podrazumijeva razliku u kamatnim stopama i odsustvo apresijacije, depresijacije (zbog fiksnog deviznog kursa) imaju stalno otvorenu opciju arbitraže kamatnih stopa.

Nepokriveni odnos kamatnih stopa ili odstupanje od nepokrivenog pariteta kamatnih stopa (*duip*) računato je kao količnik domaće i strane kamatne stope po formuli $\left(- \left[\frac{1+i_d/100}{1+i_f/100} \right] - 1 \right) * 100$, gdje je i_d domaća (BiH) kamatna stopa, a i_f strana kamatna stopa.

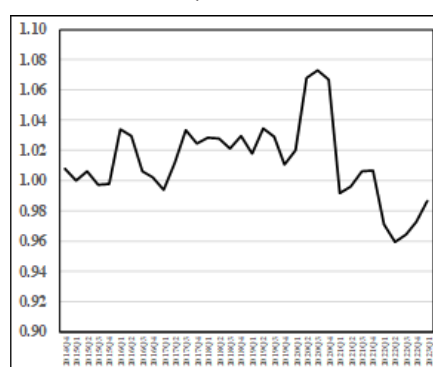
Tabela 1 - Deskriptivna statistika varijabli

Naziv varijable	Prosjek	Maksimum	Minimum	Standardna devijacija	Koeficijent varijacije
Logaritam realnog efektivnog deviznog kursa (<i>l_reer</i>)	4,59	4,66	4,54	0,03	0,01
Uslovi razmjene (<i>tt</i>)	1,01	1,07	0,96	0,03	0,03
Realna domaća kamatna stopa (<i>rdir</i>)	-2,56	2,33	-17,55	5,24	-2,05
Razlika u produktivnosti (<i>proddif</i>)	1,01	1,07	0,95	0,03	0,03
Razlika u cijenama (<i>pothdif</i>)	1,19	1,36	1,09	0,07	0,06
Nepokriveni paritet kamatnih stopa (<i>duip</i>)	0,07	3,38	-0,50	0,69	9,82

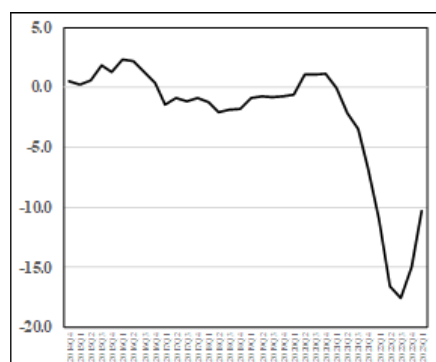
Izvor: BHAS, CBBiH, ECB (Obradio autor)

Grafikon 1 - Realni efektivni devizni kurs, 2015 = 100 (*l_reer*), Q4 2014 – Q1 2023.

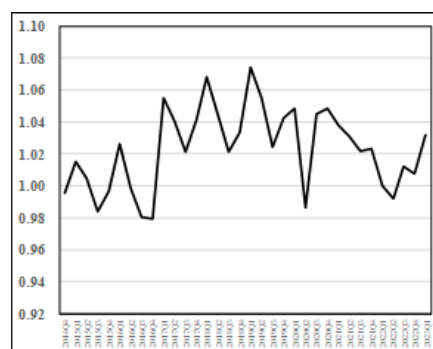
Izvor: CBBiH

Grafikon 2 - Uslovi razmjene (*tt*) Q4 2014 – Q1 2023.

Izvor: BHAS

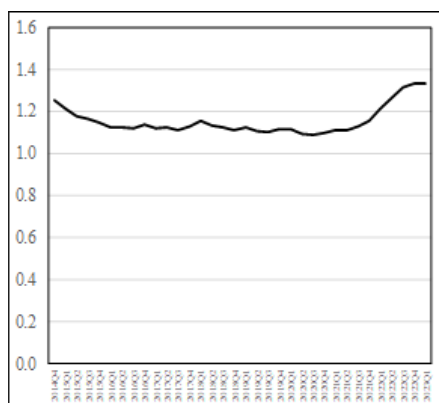
Grafikon 3 - Realna domaća kamatna stopa, u % (*rdir*) Q4 2014 – Q1 2023

Izvor: CBBiH (Obradio autor)

Grafikon 4 - Razlika u produktivnosti (*proddif*) Q4 2014 – Q1 2023

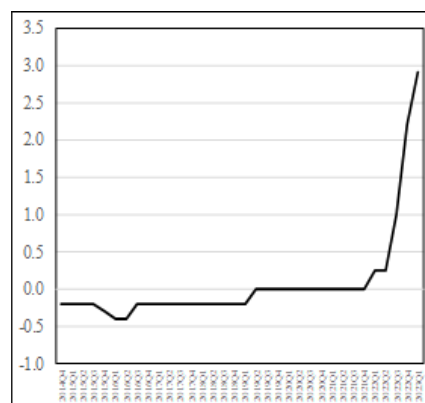
Izvor: BHAS (Obradio autor)

Grafikon 5 - Razlika u ostalim cijenama (pothdif) Q4 2014 – Q1 2023.



Izvor: BHAS (Obradio autor).

Grafikon 6 - Nepokriveni paritet kamatnih stopa, u % (duip) Q4 2014 – Q1 2023.



Izvor: BHAS i CBBiH (Obradio autora).

Istraživanje obiluje brojnim skraćenicama (Tabela 2), neke od njih su manje a neke više poznate, ali sve one olakšavaju praćenje rezultata istraživanja pa ih dajemo u formi pregleda.

Tabela 2 - Pregled skraćenica

Skraćenica	Objašnjenje	Skraćenica	Objašnjenje
CBBiH	Centralna banka BiH	REER	Realni efektivni devizni kurs
CPI	Indeks potrošačkih cijena	REER_MRM	Ocijena REER na osnovu MRM
<i>duip</i>	Devijacija od nepokrivenog pariteta kamatnih stopa	REER_VEC	Ocijena REER na osnovu VECM
ECB	Evropska centralna banka	REER_F_VEC	Prognoza REER na osnovu VECM
I(1)	Jedinični korijen	REER_F_MRM	Prognoza REER na osnovu višestrukog regresionog modela
IRP	Paritet kamatnih stopa	RMSE	Korijen kvadrata prosječne greške
KM, BAM	Oznaka za BiH valutu, konvertibilnu marku	Theil	Tejlov koeficijent nejednakosti
KV	Kointegracioni vektor	tt	uslovi razmjene
<i>L_reer</i>	Logaritam realnog efektivnog deviznog kursa	<i>duip</i>	Odstupanje od nepokrivenog pariteta kamatnih stopa
LT_REER, EREER	Ravnotežni ili dugoročni REER	VAR	Vector autoregression
MAE	Srednja prosječna greška	VECAM	Vector Error Correction Model
MAPE	Mean absolute percentage error	MRM	Višestruki regresioni model
<i>pothdif</i>	Diferencija u ostalim cijenama (ostale cijene su potrošačke cijene)	i_d	Domaća (BiH) nominalna kamatna stopa - na višak rezervi banaka kod CBBiH
<i>proddif</i>	Razlika u produktivnosti	i_f	Strana nominalna kamatna stopa - na višak rezervi kod ECB
<i>rdir</i>	Realna domaća (BiH) kamatna stopa		

Izvor: Autor

Rezultati i diskusija

Sve varijable imaju jedinični korijen I(1), nisu stacionarne, a stacionarnost varijabli je osnovni uslov za primjenu VAR (Tabela 3). Dalje modeliranje ide kroz testiranje hipoteze o postojanju kointegracionih vektora kada se, ako se hipoteza potvrdi, upotrebljava VECAM, a u suprotnom modeliranje ekonomskih procesa se vrši pomoću VAR sa diferenciranim varijablama.

Tabela 3 - Augmented Dickey-Fuller test

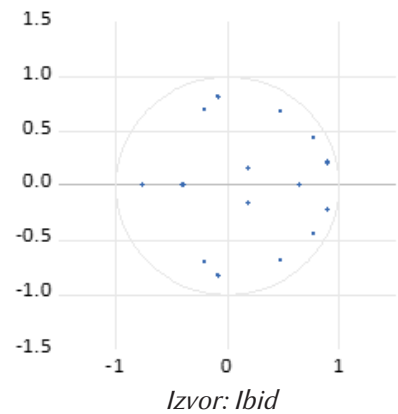
Varijabla	Kritična vrijednost testa (5%)	T statistika	Vjerovatnoća
<i>L_reer</i>	-2,95	-2,22	0,20
<i>tt</i>	-2,95	-1,18	0,67
<i>rdir</i>	-2,95	-1,76	0,39
<i>pothdif</i>	-2,95	-1,48	0,53
<i>proddif</i>	-2,95	-1,42	0,56
<i>duip</i>	-2,95	1,36	1,00

Izvor: Autor

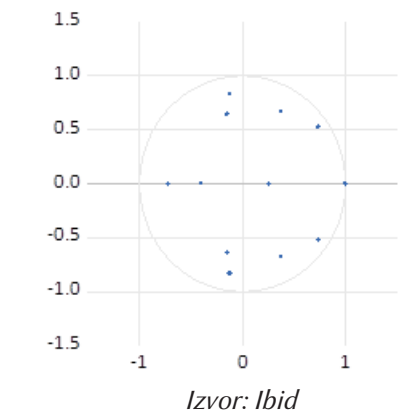
Razvijeni VAR model sa pet varijabli (*L_reer*, *tt*, *rdir*, *ppoth*, *proddif* i *duip*) i konstantom sugerise po jednoj grupi kriterija (AIC i HQ) dva pomaka, a po drugoj grupi kriterija četiri laga (FPE, LR), a mi smo se radi izbjegavanja previše parametara (eng. overparametrisation) opredijelili za VAR sa tri pomaka.

Kvalitet VAR modela smo testirali preko testa homoskedastičnosti reziduala, testa serijske korelacije, testa normalnog rasporeda reziduala i rasporeda ajgen vrijednosti. Nije moguće odbaciti nultu hipotezu o normalnom rasporedu reziduala (Jarque Bera od 5,75 i 10 stepeni slobode daje vjerovatnoću od 0,83), kao ni hipotezu o odsustvu serijske korelacije (sve F statistike za dati broj stepeni slobode daju vjerovatnoću iznad 0,14). Heteroskedastičnost reziduala, koja daje neefikasnu ocijenu parametara osnovnog skupa, nije moguće dokazati, jer se zajedničkom Hi kvadrat statistikom od 454 za 450 stepeni slobode i vjerovatnoćom od 0,43 ne odbacuje nultu hipotezu o homoskedastičnosti reziduala, a visoku vjerovatnoću daje i test individualnih komponenti. Ključni pokazatelj zadovoljavajuće dijagnostike modela je i stepen stabilnosti modela. I VAR model i na osnovu njega sačinjen VECAM model su stabilni (Grafikon 7 i Grafikon 8). Korijeni kompanion matrice su ajgen vrijednosti. Da bi VAR i VECAM model bili stabilni ajgen vrijednosti moraju ležati unutar jediničnog kruga, a taj uslov je ispunjen.

Grafikon 7 - Raspored ajgen vrijednosti za VAR model



Grafikon 8 - Raspored ajgen vrijednosti za VECAM model



Broj vremenskih pomaka u VECAM modelu je za jedan manji nego u VAR, a Johansonov test kointegracije baziran na restriktivnom testu kointegracije odbacuje hipotezu o nula kointegracionih vektora (Tabela 4) i sugeriše postojanje minimalno jednog kointegracionog vektora.

Tabela 4 - Nerestriktivni test kointegracije ranga (maksimalna ajgenvrijednost)

Hipoteza	Ajgenvrijednosti	Maksimalna ajgenvrijednost	Kritična vrijednost na nivou signifikantnosti od 0,05	Vjerovatnoća
Nijedan KV *	0,68	38,70	33,88	0,01
Najviše 1 KV	0,48	22,15	27,58	0,21
Najviše 2 KV	0,38	16,05	21,13	0,22
Najviše 3 KV	0,25	9,65	14,26	0,24
Najviše 4 KV	0,06	2,24	3,84	0,13

Izvor: *Ibid*

Napomena: KV – kointegracioni vektor

Svi koeficijenti u kointegracionom vektoru (Tabela 5) imaju t statistiku kojom se odbacuje nulta hipoteza o nesignifikantnosti koeficijenata. U kratkoročnu jednačinu varijable kointegracionog vektora, koji predstavlja ravnotežni ili dugoročni REER sa aspekta fundamentalnih faktora, ulaze sa predznakom minus (podvučeni dio formule 1) i vremenskim pomakom za jedan period, čime se koriguje kratkoročno odstupanje REER od njegovog dugoročnog trenda. Brzina prilagođavanja (eng. speed of adjustment) zavisi od veličine koeficijenta prilagođavanja, koji je -0,24 (Formula 1), uzrokujući da prilagođavanje traje skoro tačno četiri kvartala (1/0,24). Sa izuzetno visokim nivoom pouzdanosti (t vrijednost od -1,84) odbacena je hipoteza da se je vrijednost koeficijenta prilagođavanja nula.

Tabela 5 - Kointegracioni vektor

	L_reer(-1)	tt(-1)	rdir(-1)	proddif(-1)	pothdif(-1)	c
Koeficijent	1	0,79787	-0,00481	-0,39462	-0,24391	-4,71
Standardna greška		-0,16	0,00	-0,14	-0,06	
t statistika		-4,90	4,30	2,75	4,06	

Izvor: *Ibid*

Formula 1 - Kratkoročna jednačina REER korigovana sa jednačinom dugoročne neravnoteže

$$D(L_REER) = -0.24*(L_REER(-1) + 0.797*TT(-1) - 0.0048*RDIF(-1) - 0.394*PRODDIF(-1) - 0.244*POTH-DIF_K(-1) - 4.708) - 0.125*D(L_REER(-1)) - 0.061*D(L_REER(-2)) + 0.247*D(TT(-1)) + 0.282*D(TT(-2)) - 0.003*D(RDIF(-1)) - 0.002*D(RDIF(-2)) - 0.145*D(PRODDIF(-1)) - 0.107*D(PRODDIF(-2)) + 0.098*D(POTH-DIF(-1)) - 0.093*D(POTH-DIF(-2)) - 0.0028$$

Dobra dijagnostika VAR modela prenijeta je i na VECAM (Tabela 6). LM test sa vjerovatnoćama značajno iznad 5% ne dopušta odbacivanje nulte hipoteze o nepostojanju serijske korelacije, a varijansa reziduala je homoskedastična (Hi kvadrat statistika od 331,8 za broj stepeni slobode od 330 daje vjerovatnoću od 0,46).

Statistika zajedničkog Jarque-Bera testa za spljoštenost i simetričnost rasporeda ima vrijednost 11,8 i za 10 stepeni slobode daje vjerovatnoću od 0,29, značajno višu od praga za odbacivanje nulte hipoteze o normalnom rasporedu reziduala (0,05).

Tabela 6 - Testovi serijske korelacije i testovi heteroskedastičnosti za VECAM*

Breusch-Godfrey LM test serijske korelacije				Breusch-Pagan-Godfrey test heteroskedastičnosti			
F-statistika	0,41	Prob. F(4,24)	0,80	F-statistika	0,78	Prob. F(5,28)	0,57
Obs*R ²	2,20	Prob. Hi kvadrat (4)	0,70	Obs* R ²	4,14	Prob. Hi kvadrat (5)	0,53

Izvor: *Ibid*

*Napomena: nulte hipoteze su definisane na način da nema serijske korelacije i da je raspored reziduala homoskedastičan. Obs. – broj opservacija. R – koeficijent determinacije, Prob. – vjerovatnoća

Iz kointegracionog vektora jednačina ravnotežnog REER se dobije izmjenom predznaka ispred koeficijenta jednačine (Formula 2). Sve varijable imaju očekivani predznak, osim varijable koja opisuje promjenu u uslovima BiH spoljnotrgovinske razmjene (tt). Brži rast domaće od strane kamatne stope (rdir) vodi ka rastu tražnje za konvertibilnom markom i ka apresijaciji REER, isto kao i brži rast produktivnosti u BiH spoljnotrgovinskim partnerima u odnosu na BiH (proddif), pa su koeficijenti ispred ovih varijabli pozitivni. Direktna korelacija postoji i između razlike u domaćim i stranim cijenama (pothdif) i pad vrijednosti ove varijable, sporiji rast domaćih od stranih cijena, prouzrokuje depresijaciju REER. Negativna vrijednost koeficijenta za uslove u spoljnotrgovinskoj razmjeni sa obzirom na karakteristike BiH ekonomije ima ekonomski logično i prihvatljivo objašnjenje.

U većini zemalja brži rast izvoznih od uvoznih cijena vodi ka apresijaciji deviznog kursa, jer brži rast vrijednosti izvoza od uvoza povećava tražnju za domaćom valutom tj. valutom izvoznika, a to uzrokuje apresijacije nominalnog deviznog kursa i preko njega, ako je sve ostalo jednako, apresijaciju REER. BiH ima fiksiran devizni kurs u odnosu na evro, a na evrozonu se odnosi oko 50% njenog izvoza, i brži rast izvoznih cijena od uvoznih ne može promijeniti nominalni devizni kurs KM. Promjena bilateralnih nominalnih deviznih kurseva KM u spoljnoj trgovini sa zemljama izvan zone evra ne dešava se samo pod uticajem izvozno-uvoznih cijena, već i pod uticajem promjena deviznih kurseva ovih zemalja u odnosu na evro, koji se potom prenose na devizni kurs konvertibilne marke u odnosu na valute ovih zemalja.

Deficit tekućeg računa platnog bilansa BiH i time deviznog bilansa hroničan je i visok i zato poboljšanje uslova u razmjeni sa inostranstvom ima marginalan uticaj na apresijaciju REER, a efekat može biti i sasvim suprotan iz sljedećeg razloga. Ako je rast izvoznih cijena i rast CPI približno isti, onda brži rast izvoznih od uvoznih cijena, preko sporijeg rasta uvoznih cijena od CPI, smanjuje inflatorne pritiske u BiH, i dovodi do depresijacije REER, čime se da objasniti negativna vrijednost koeficijenta za uslove razmjene. S druge strane pogoršanje uslova razmjene, sporiji rast BiH izvoznih od BiH uvoznih cijena, povećava inflaciju i prouzrokuje apresijaciju REER.

Formula 2. Ravnotežni REER konvertibilne marke

$$l_{reer} = -0,79 * tt + 0,0048 * rdir + 0,39 * proddif + 0,24 * pothdif + 4,71$$

U cijelom posmatranom periodu REER odstupa od EREER, a vrijednost odstupanja se povećava tokom pandemije (Q2 2020 – Q1 2022) i u vremenu visoke inflacije (Q2 2022 – Q1 2023). U ova dva perioda standardna devijacija odstupanja REER od EREER značajno je viša od standardne devijacije u cijelom periodu prije izbijanja pandemije korona virusa (Tabela 7).

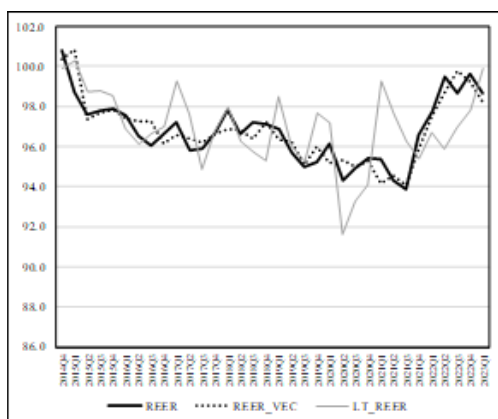
Periodi vanrednih globalnih ekonomskih okolnosti povećavaju veličinu odstupanja REER-a od njegove ravnotežne vrijednosti u poređenju sa periodom kada su izostali globalni ekonomski poremećaji. I minimalne i maksimalne vrijednosti odstupanja su veće u kriznim periodima, a raspon između ovih vrijednosti je i do dva puta veći tokom perioda globalnih ekonomskih poremećaja. REER konvertibilne marke najviše je odstupio od ravnotežnog REER u periodu pandemije korona virusa, kada je zabilježena i najveća volatilnost mjerena devijacijom, ekstremnim vrijednostima i njihovim rasponom.

Tabela 7 - Odstupanje REER od njegove ravnotežne vrijednosti (LT_REER)

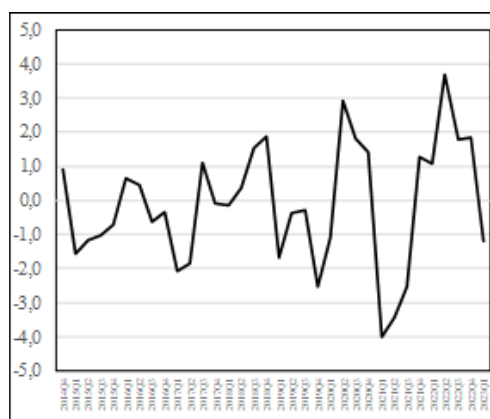
	Odsustvo globalnih ekonomskih poremećaja	Pandemija korona virusa	Rast inflacije	Pandemija i rast inflacije
Period	Q4 2014 - Q1 2020.	Q2 2020 - Q1 2022.	Q2 2022 - Q1 2023.	Q2 2020 - Q1 2023.
Standardna devijacija (1)	1,2	2,7	2,0	2,5
Maksimalna vrijednost (2)	1,9	2,9	3,7	3,7
Minimalna vrijednost (3)	-2,5	-4,0	-1,2	-4,0
Raspon (4= 2-3)	4,4	6,9	4,9	7,7

Izvor: *Ibid*

Grafikon 9 - REER i ravnotežni REER, Q4 2014 - Q1 2023.godine, 2015 = 100

Izvor: *Ibid*

Grafikon 10 - Odstupanje REER od ravnotežnog REER, u %

Izvor: *Ibid*

Ocijena kretanja REER je izvršena na osnovu višestrukog regresionog modela koji ima pet nezavisno promjenljivih varijabli i koji, za razliku od VECAM-a, uključuje i varijablu *duip* - devijacija od nepokrivenog pariteta kamatnih stopa (Tabela 8). Sa ovih pet varijabli objašnjeno je 87% varijabiliteta REER-a, pri čemu i sama dijagnostika modela pokazuje kvalitet odabrane specifikacije modela. Ne može se odbaciti hipoteza o nepostojanju autokorelacije (vrijednost Q statistike daje vjerovatnoću od 0,55 i iznad), kao ni hipoteza o normalnom rasporedu reziduala (vrijednost Jarque Berra statistike je 0,37, a vjerovatnoća 0,83). U višestrukom regresionom modelu ne postoji serijska korelacija, kao ni heteroskedastičnost. Ni pretpostavka o nepostojanju serijske korelacije ni pretpostavka o homoskedastičnosti reziduala ne mogu biti odbačeni – izračunate statistike imaju niske vjerovatnoće.

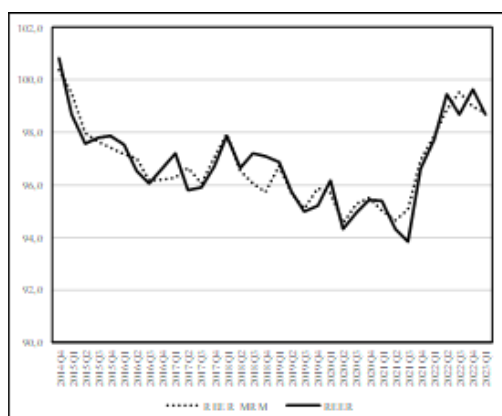
Tabela 8 - Višestruki regresioni model, zavisno promjenljiva I_{reer}

	Koeficijent	Standardna greška	T-statistika	Vjerovatnoća
c	4,20	0,09	44,57	0,000
$tt(-3)$	-0,163	0,05	-2,97	0,006
$rdir$	0,001	0,00	2,85	0,008
$proddif$	0,113	0,05	2,27	0,030
$pothdif$	0,367	0,03	10,79	0,000
$duip$	-0,017	0,00	-6,01	0,000

Izvor: Ibid

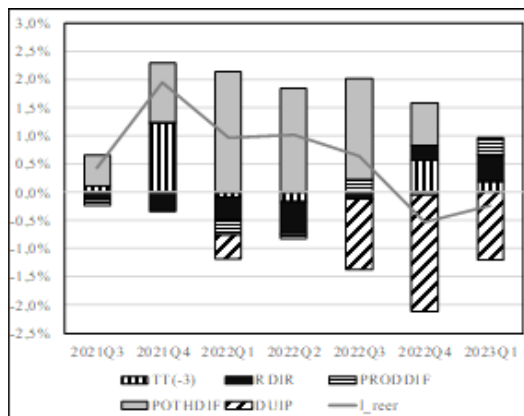
Ocijena REER na osnovu višestrukog regresionog modela (RM) i njegova dekompozicija ukazuju na determinate REER-a (Grafikon 11). Sve do kraja 2022. godine ključni pozitivni doprinos rastu-apresijaciji REER daje brži rast domaćih od stranih potrošačkih, cijena (Grafikon 12). U zadnja dva kvartala, uslijed niže inflacije, doprinos $rdir$ (realna BiH kamatna stopa) pozitivan je, kao i uslova razmjene (pad uvoznih cijena) i razlike u produktivnosti. Jaču apresijaciju REER spriječila je razlika u nepokrivenom paritetu kamatnih stopa ($duip$) sa izraženim negativnim doprinosom promjenama REER. Naime, prva velika razlika između strane (veće) i BiH (niže) kamatne stope, u periodu rasta inflacije, pojavila se u prvom kvartalu 2022. godine kada je kamatna stopa na višak rezervi banaka kod ECB bila -0,5%, a kamatna stopa na višak rezervi kod CBBiH -0,75%, stvarajući nepokriveni odnos kamatnih stopa. Prema teoriji pokrivenog pariteta kamatnih stopa, da bi se spriječila permanentna arbitraža kamatnih stopa (pozajmljivanje u valuti sa nižom kamatnom stopom (BiH) i investiranje u valutu sa višom kamatnom stopom (zona evra)) valuta u prvoj zemlji treba apresirati, a valuta u drugoj zemlji depresirati. U režimu fiksnog deviznog kursa ovakav proces zatvaranja kamatne arbitraže (eng. carry trade) nije moguć i devizni kurs EURKM od 1,95583 viši je od onog koji zahtjeva pokriveni paritet kamatnih stopa. To ostavlja bh valutu podcijenjenom, što je jednako depresijaciji nominalnog deviznog kursa, koja utiče na depresijaciju REER konvertibilne marke. Zato je odnos između nepokrivenog pariteta kamatnih stopa i REER inverzan - njegov rast obara (depresira) REER, a njegov pad povećava (apresira) REER. Postoji još jedno, ekonomsko, objašnjenje inverznog odnosa razlike između strane i domaće kamatne stope, i REER, po kojem rast ove razlike povećava neto odliv sredstava iz BiH i smanjujući kreditni potencijal banaka umanjuje kreditni rast i ponudu novca ($M1$ i $M2$). Rast ponude novca manji od potencijalnog stvara manji pritisak na cijene, depresirajući REER (pod uslovom da je sve ostalo jednako).

Grafikon 11 - REER i REER_MRM, 2015 = 100



Izvor: Ibid

Grafikon 12 - Doprinosi promjeni REER_MRM



Izvor: Ibid

Opisani mehanizam djelovanja odstupanja od nepokrivenog pariteta kamatnih stopa u režimu fiksnog deviznog kursa, tj. mnogo bržeg rasta strane od BiH kamatne stope bez mogućnosti apresijacije nominalnog deviznog kursa EURKM intenzivno djeluje na REER u drugoj polovini 2022. godine, te u prvom kvartalu 2023. godine. U prosjeku tokom ova tri kvartala strana kamatna stopa viša je od BiH kamatne stope za 129 b.p., a pošto izostaje apresijacija KM u odnosu na evro, postojeći fiksni devizni kurs stimulatивно djeluje na depresijaciju REER, pa je doprinos nepokrivenog pariteta kamatnih stopa kretanju REER-a izraženo negativan.

Od početka ubrzanog rasta inflacije apresijaciju REER-a konvertibilne marke determiniše prvo brži rast BiH potrošačkih cijena, pad produktivnosti, pogoršanje uslova razmijene i na kraju rast BiH realne kamatne stope. Zbog ubrzanog rasta kamatnih stopa ECB, te izuzetno niskog stepena restriktivnosti BiH monetarne politike i kamatne diferencije koje su proizvele takve monetarne politike, uticaj dup na depresijaciju REER-a postaje sve izraženiji.

Na osnovu formiranih modela za period Q1 2014 - Q1 2023. godine izvršili smo prognozu kretanja REER jedan period (kvartal) izvan uzorka. Višestruki regresioni model ima u uzorku bolju ocijenu REER i manju grešku prognoze nego VECAM (Tabela 9) po svim pokazateljima (RMSE, MAE, MAPE, Theil). Međutim, izvan uzorka (Q2 2023) REER_F_VECAM daje malo bolju prognozu od višestrukog regresionog modela tj. od REER_F_MRM (Tabela 9) a vrijednost kombinovane prognoze, dobijene iz prosjeka ovih prognoza, na nivou je ostvarenog REER-a u drugom kvartalu 2023. godine.

Tabela 9 - Pokazatelji ocijene REER, Q1 2014 – Q1 2023. god.

	RMSE	MAE	MAPE	Theil
MRM	0,00622	0,004891	0,106918	0,00068
VECAM	0,007394	0,005756	0,125782	0,000808

Izvor: *Ibid*

Tabela 10 - REER i prognoza REER za Q2 2023. godine

	RERR	REER_F_VEC	REER_F_MRM	Kombinovana prognoza
	98,0	96,8	99,3	98,1
Greška prognoze (prognoza u odnosu na REER)	-	-1,1%	1,4%	0,0%

Izvor: *Ibid*

Zaključna razmatranja

U režimu fiksnog deviznog kursa jedna od prihvatljivih metoda određivanja spoljnotrgovinske konkurentnosti je promjena u realnom efektivnom deviznom kursu. REER je predstavljen kao suma bilateralnih deviznih kurseva spoljnotrgovinskih partnera ponderisanih odnosom stranih i domaćih cijena, a izražen je u obliku baznog indeksa, na način da rast predstavlja njegovu apresijaciju, a pad njegovu depresijaciju. Njegova se vrijednost može odrediti i na osnovu fundamentalnih ekonomskih varijabli i tako dobijen REER predstavlja ravnotežni ili dugoročni REER, koji zavisno od kretanja njegovih fundamentalnih ekonomskih determinanti može značajno odstupiti od tekućih vrijednosti REER.

Ravnotežni REER konvertibilne marke izveden je iz kointegracionog vektora VECAM modela sačinjenog od pet varijable; REER, uslovi razmjene, realna BiH kamatna stopa, razlike u produktivnosti i razlike u ostalim cijenama (CPI).

Ocijena REER-a za period Q4 2014 - Q1 2023. godine i prognoza REER jedan period-kvartal izvan uzorka izvedena je na osnovu konstruisanog VECAM modela, kao i na osnovu višestrukog regresionog modela, kojem je dodata i varijabla odstupanje od nepokrivenog pariteta kamatnih stopa.

Tokom perioda pandemije korona virusa i ubrzanog rasta inflacije volatilitnost odstupanja REER-a konvertibilne marke od ravnotežnog REER-a mnogo je veća nego u periodu kada nije bilo globalnih ekonomskih poremećaja.

Glavni uzrok nagle apresijacije REER koja je započeta krajem 2021. godine je prije svega brži rast BiH potrošačkih cijena od stranih potrošačkih cijena. Razlika u potrošačkim cijenama stvarala je apresijacijske pritiske, dok je razlika u kamatnim stopama uticala na depresijaciju REER. Do trećeg kvartala 2022. godine domaća realna kamatna stopa je uzrokovala pad REER-a (depresijacija), a nakon njenog rasta ona povećava-apresira REER. Od polovine 2022. godine pogoršanje uslova razmjene, koje djeluje sa vremenskim pomakom, apresira vrijednost REER-a (zbog bržeg rasta cijena uvoza, od cijena izvoza). Takođe od polovine 2022. godine brži rast produktivnosti u inostranstvu u poređenju sa BiH daje pozitivan doprinos vrijednosti REER.

Prognoza REER-a za drugi kvartal 2023. godine izračunata kao prosjek dobijene prognoze pomoću VECAM modela i višestrukog regresionog modela je identična realizovanoj vrijednosti REER. Aritmetička sredina prognoze je izravnila greške u prognozama pojedinačnih modela i dala precizniju vrijednost prognoze od one koju su dali individualni modeli, demonstrirajući viši kvalitet kombinovane prognoze u poređenju sa prognozom koja je dobijena na bazi individualnih modela. Iz dobijenih rezultata istraživanja moguće je i dati prijedloge kreatorima ekonomske politike u Bosni i Hercegovini usmjerene na očuvanje spoljno-trgovinske konkurentnosti na osnovu kretanja REER-a i njegovog odstupanja od ravnotežne vrijednosti. Ključni razlog apresijacije REER-a je brži rast BiH potrošačkih cijena od onih u inostranstvu i zato antiinflaciona politika treba biti osnov svake buduće ekonomske politike u BiH.

Produktivnost kao osnovi ekonomski princip poslovanja, a u vezi njenog sporijeg rasta u BiH u odnosu na okruženje, mora biti predmet stalnog unapređenja i rasta, kako bi se izbjegli apresijacijski pritisci na REER. Rast kamatnih stopa u BiH bilo kroz rast BiH realne kamatne stope, ili kroz smanjenje nepokrivenog pariteta kamatnih stopa sa ciljem smanjenja odliva kapitala iz BiH, izlaže REER apresijaciji. Međutim, monetarna politika vođena kroz povećanje BiH kamatne stope ne bi imala visok stepen efikasnosti zbog izuzetno visoke likvidnosti BiH bankarskog sektora (sredstva iznad obavezne rezerve u Q3 2023. godine čine 7,8% aktive BiH banaka), odsustva kredita Centralne banke BiH i nemogućnosti vršenja sterilizacije primarnog novca.

Od momenta kada je CBBH počela smanjivati kamatne stope (jula 2016. godine) do decembra 2022. godine neto strana aktiva BiH bankarskog sektora (potraživanje prema nerezidentima minus obaveze prema nerezidentima) se sa 75 miliona KM povećala na 3,12 milijarde KM (7% BDP), i ako se želi izbjeći apresijacija REER-a do koje vodi rast BiH kamatne stope, onda je bolje da se umjesto rasta kamatnih stopa ovaj nepovoljni devizni saldo uravnoteži kroz povećanje obaveznih rezervi, ili direktnom ili indirektnom, opreznosnom (prudencionom) regulacijom izloženosti BiH banaka prema inostranstvu. Uslovi razmjene, mjereni kao odnos BiH izvoznih cijena i uvoznih cijena, ne djeluju na način da njihovo poboljšanje (brži rast izvoznih cijena od uvoznih cijena) apresira devizni kurs KM (zbog veće ponude deviza na BiH tržištu).

Čini se da je za depresijaciju deviznog kursa REER-a, u kontekstu uslova razmjene, najbitnije da uvozne cijene rastu sporije od izvoznih cijena. Pošto svaki globalni cijenovni šok (rast uvoznih cijena) vodi ka rastu cijena u BiH i apresijaciji REER-a (sve ostalo jednako) za BiH je izuzetno bitno da takve negativne eksterne šokove apsorbuje kroz efikasnu antiinflacionu politiku i povećanje produktivnosti.

S obzirom da višestruki regresioni model daje vrlo dobru ocijenu ravnotežnog realnog efektnog deviznog kursa, pri čemu se pod ravnotežnim REER podrazumjeva REER određen fundamentalnim faktorima, buduća istraživanja bi se mogla kretati prema određivanju teorijske vrijednosti REER-a koja saldo tekućeg računa BiH svodi na nulu. Na osnovu tako dobijenog teorijskog REER koji uklanja negativni saldo tekućeg računa moguće je odrediti njegove komponente, tj. kompoziciju potrebnu za uravnoteženje tekućeg djela platnog bilansa. Dobijeni rezultati ovih perspektivnih istraživanja bi predstavljali solidnu teoretsku osnovu za koncipiranje politike uravnoteženja salda tekućeg računa Bosne i Hercegovine koji je godinama hroničan i visok.

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MOVEMENT OF THE REAL EFFECTIVE EXCHANGE RATE OF THE CONVERTIBLE MARK

Dragan Jović, PhD

Economist, Central Bank of Bosnia and Herzegovina

dragan.jovic@cbbh.ba

Summary: In the research, we evaluated the equilibrium real effective exchange rate of the convertible mark and identified a significant deviation of the real effective exchange rate of the convertible mark concerning the equilibrium level, especially during the period of the coronavirus pandemic and global inflation growth. During the period of globally high inflation, the main determinant of REER appreciation was the faster growth of BH price from foreign prices and slower growth of productivity in BH compared to the environment, and to a lesser extent the growth of the domestic real interest rate and changes in terms of exchange. In addition to these appreciation pressures, the impact of uncovered interest rate parity on the depreciation of REER was expressed, due to the extremely restrictive monetary policy of the ECB and the lower degree of restrictiveness of the monetary policy in BH, from the aspect of the level of foreign and domestic interest rates. The volatility of the REER deviation from the equilibrium REER is higher in crisis periods. The isolated determinants of REER of the convertible mark provide a good analytical basis for the creation of BH monetary policy and regulation of the banking sector.

Keywords: exchange rate, exchange rate regime, monetary policy, currency board, fixed exchange rate, real effective exchange rate.

JEL classification: E52, F31

Introduction

Each exchange rate regime consists of bilateral exchange rates, which determine the price of foreign goods in domestic currency and thus the most important part of economic relations in the exchange of goods and services of one country with individual countries or currency areas. The nominal effective exchange rate (NEER), as the initial form of the multilateral exchange rate, provides information on the movement of the country's exchange rate concerning the main or all foreign trade partners, and shares in foreign trade are taken as weights. The real effective exchange rate (REER) represents the NEER corrected with some price effect, unit labor costs (ULC), or more commonly consumer prices (CPI). The fixed exchange rate of BH currency to the euro (1 EUR = 1.955830 KM) established in 1997 means that most other exchange rates of the convertible mark (KM) concerning the legal means of payment of other countries are aligned with changes in the EURKM exchange rate. That BH monetary, and in a broader sense, economic policy, takes away the possibility of adjusting to external shocks by changing the exchange rate, so the burden of adjustment is shifted to consumer prices, that is, to the REER in which they are incorporated. That is why the economic concept of the exchange rate established through the REER is crucial for evaluating the position of Bosnia and Herzegovina in the international division of labor.

Our goal is to model the movement of the REER of the convertible mark and to determine the equilibrium REER or EREER within that assessment, as well as to determine the determinants of the REER. By balance in this research, following the example of (Feyzioglu, 1997) we do not mean REER that achieves internal and external economic balance, but long-term equilibrium REER that is formed under the influence of the main, fundamental, economic determinants of REER (Edwards, 1994). We assume that the above-average growth of inflation in BH during 2022 as well as the drop in productivity led to the appreciation of REER, while the extremely slow growth of BH interest rates compared to the ECB interest rate acted on the depreciation of the REER of the convertible mark. We also want to confirm the assumption that REER deviates from the long-term equilibrium REER, especially in crisis periods such as pandemics and accelerated inflation growth. Given that the EREER assessment is performed through the REER forecast in the sample, an additional result of the research is the comparison of the REER forecast for one period out the sample. That is why we set an additional assumption of the research in which we claim that the combining forecast gives a more accurate forecast than individual forecasts, i.e. trials based on one methodology.

Research is planned as follows. First, we give a brief overview of the reference literature in this area, with a special emphasis on research of BH authors carried out on this or borderline topics, and in this part of the research we discuss the very concept of EREER. After that, we present the methodological basis of the work, describe the data used, and additionally explain the multilateral exchange rates. The presentation of the research results and their discussion are placed in the central part of the paper, followed by a conclusion in the form of a summary discussion that ends with the presentation of recommendations for economic policymakers and the determination of future champions of research on this topic.

Literary Review

The first and only known attempt to model the REER of a convertible mark (Omerbegović, 2006) using VECAM includes four variables; openness in current prices ((exports + imports)/GDP), foreign trade balance in constant prices ((exports - imports)/GDP), external debt (external debt service/exports) and government spending. The main finding of this research is that there is a significant and permanent positive deviation of the equilibrium REER (approximated by the long-term REER equation) to the REER. The following research on the subject of the exchange rate of the convertible mark (Marić, 2012) investigates the nominal exchange rate and concludes that the regime of the currency board leads to a systemic appreciation of the domestic currency, which produces a long-term current account deficit. The strongest criticism of the BH currency board so far comes to a similar finding (Milojević, 2012), in which it is pointed out that “the currency board is worse than the gold standard”, and that “instead of balancing the balance of payments, there is a process of increasing the payment deficit based on a continuous increase in the overvaluation of the currency”. In this research, it is estimated that the equilibrium exchange rate EURKM is 3, and that a depreciation of 50% is needed to equalize with the equilibrium nominal exchange rate. Both of these studies require the depreciation of the convertible mark, ignoring the high degree of euroization of the BH economy, and they also fail to notice that in the fixed exchange rate regime, the adjustment of the balance of payments is done in a much broader context of REER. Investigating the types of foreign exchange regimes of the group of authors from BH (Vujanić, Žarković, & Gligorić, 2017) on a sample of 10 transition countries (2010) find that a variable exchange rate, from the aspect of internal and external imbalance, is a better option for more developed countries in transition, but not for less developed countries in transition, implicitly recommending the holding of BH currency board. In the context of the selected research topic, the finding that the real exchange rate of the convertible mark was underestimated by about 2% compared to productivity growth in the first years of the transition is particularly interesting (Čizmović, 2016). Based on previous research on the long-term equilibrium exchange rate (Edwards, 1994), a link between the exchange rate and fundamental variables was developed in the example of Finland (Feyzioglu, 1997). In this approach, there is no need to define the appropriate level of internal and external imbalance, because they are endogenous to the system. In this research, five variables were used to formulate the relationship between REER and fundamental variables in a reduced form, and for our research, this research is a reference. The author found a strong influence of all selected variables (terms of exchange, differences in other prices and productivity, real interest rate, and deviation from uncovered interest rate parity) on the deviation from the long-term equilibrium exchange rate of Finland in the period from 1975 to 1995. At the global level, the determinants of the real exchange rate were investigated concerning the main world currencies (dollar, yen, marka) (MacDonald, 1997). Concerning hard currencies, which make up the largest part of the world's foreign exchange reserves, the author finds that the key determinants of equilibrium exchange rates are the fiscal balance, net foreign assets, and the real savings rate, which enter the equation with a positive coefficient, while the real price of oil and terms of exchange can have both a positive and a negative parameter. In a sample of Asian countries (Jongwanich, 2009) in different periods, with the application of the cointegration technique and a total of 6 variables (government consumption in relation to the trade sector, government consumption in relation to the non-trade sector, net foreign assets, productivity, terms of trade and openness of the economy) a significant deviation from the equilibrium REER was recorded. In this research, which is very important for Bosnia and Herzegovina, it was found that the terms of exchange, defined as the ratio of export and import prices, can have a coefficient of both positive and negative sign in the REER equation. Research on the Argentine economy (Coppola, Lagerborg, & Mustafaoglu, 2017) based on four key variables (terms of exchange, productivity gap, foreign exchange reserves, and trade openness) revealed a high overvaluation of the Argentine currency in the period from 1980 to 2015.

Methodology, Data, and Data Transformation

The main methodological research tools are the vector autoregression model (VAR), the multiple linear regression model (MRM), and descriptive statistics. In determining the preferred VAR model for EREER assessment and forecasting, we used a standard procedure. First, we examined the existence of a unit root $I(1)$ with the Augmented Dicky Fuller test (ADF test), and then a level VAR was constructed, and the optimal number of time shifts in the variables was determined using the Akaike information criterion (AIC), Hannan-Quinn information criterion (HQ), Final prediction error (FPE) sequential modified LR test statistic (LR). If the variables in the model are $I(1)$ and not stationary $I(0)$ VAR must be replaced by VAR with error correction, which arises due to short-term deviation from the long-term trend. VECM (vector error correction model) has a smaller number of lags than VAR in the level on which it is constructed, and the rank of VECAM, which determines the number of cointegration equations, is obtained by the Johanson cointegration test (non-restrictive rank cointegration test - maximum eigenvalue).

We tested the assumptions regarding the residuals in the VAR and VECAM model for autocorrelation (Q-stat), serial correlation (Breusch-Pagan LM test), homoscedasticity (Breusch-Pagan-Godfrey test), and normal distribution of residuals (Jarque-Bera test), and stability VAR model using the eigenvalues of the companion matrix.

All variables are at the quarterly level, and the sample based on which the models were evaluated covers the period from Q1 2014 to Q1 2023. In accordance with (Feyzioglu, 1997) we selected five fundamental variables (Table 1 and graphs 1-6) for the construction of the VAR model; terms of trade, domestic interest rate, difference in productivity, difference in other prices, deviation from uncovered interest rate parity. Since exchange rates in REER convertible marks are defined by the direct notation (e.g., 1 KM = 0.51 EUR) and the ratio of BH CPI and foreign CPI, terms of exchange are determined as the ratio of the BH export price index and BH import price index (2015 = 100). The domestic (BH) interest rate is a fee on funds above the mandatory reserve of banks with the CBBH or on excess reserves (deposit facility rate). Productivity is calculated as real GDP per employee weighted with the participation of each BH foreign trade partner in Bosnia and Herzegovina. foreign trade exchange.

The average weighted value of the productivity of the countries that trade with BH compared to the level of productivity in BH (real GDP to the number of employees) gives the difference in productivity. And CPI BH of foreign trade partners was calculated as a weighted average (weights are shares in foreign trade exchange), whereby the difference in other prices (pothdif) is obtained as a quotient of BH CPI and foreign CPI. The theory of the ratio (parity) of interest rates considers that the difference in interest rates between countries must lead to the depreciation of the currency of the country that has a higher interest rate, i.e. to the appreciation of the currency of the country that has a lower interest rate and that therefore permanent arbitrage of interest rates in the form of investment by investors is not possible from a country with a lower interest rate to a country with a higher interest rate (carry trade). In the fight between two theories of interest rates (Krušković, 2014, str. 281) in BH, the third theory proved to be correct, which, despite the fixed exchange rate and BH chronic current account deficit, the reference interest rate of BH is lower than in the reserve currency countries (eurozone). Due to the uncovered interest rate parity (UIP), which implies the difference in interest rates and the absence of appreciation and depreciation (due to the fixed exchange rate), investors from Bosnia and Herzegovina have the option of interest rate arbitrage.

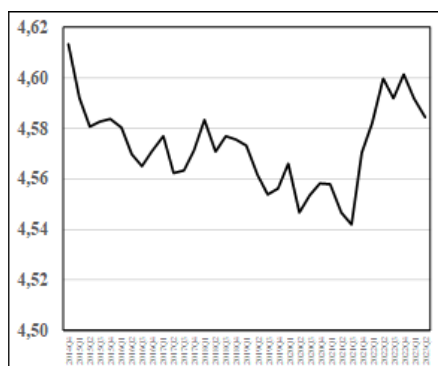
The uncovered interest rate parity or deviation from uncovered interest rate parity (*duip*) was calculated as the quotient of domestic and foreign interest rates according to the formula $\left(- \left[\frac{1+i_d/100}{1+i_f/100} \right] - 1 \right) * 100$, where i_d is the domestic (BH) interest rate, and i_f is the foreign interest rate.

Table 1 - Descriptive Statistics of Variables

Variable	Average	Maximum	Minimum	Standard deviation	Coefficient of variation
The logarithm of the real effective exchange rate (<i>l_reer</i>)	4.59	4.66	4.54	0.03	0.01
Terms of Exchange (<i>tt</i>)	1.01	1.07	0.96	0.03	0.03
Real domestic interest rate (<i>rdir</i>)	-2.56	2.33	-17.55	5.24	-2.05
Productivity difference (<i>proddif</i>)	1.01	1.07	0.95	0.03	0.03
Price difference (<i>pothdif</i>)	1.19	1.36	1.09	0.07	0.06
Deviation from uncovered interest rate parity (<i>duip</i>)	0.07	3.38	-0.50	0.69	9.82

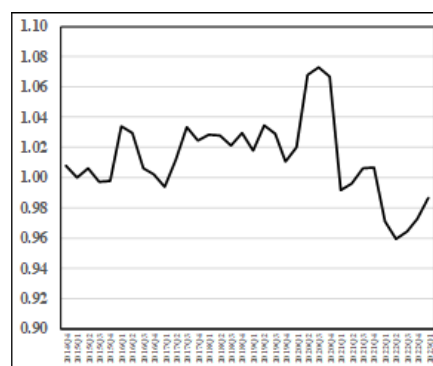
Source: BHAS, CBBH, ECB (Adapted by the author).

Chart 1 - Real Effective Exchange Rate, 2015 = 100 (*l_reer*), Q4 2014 – Q1 2023



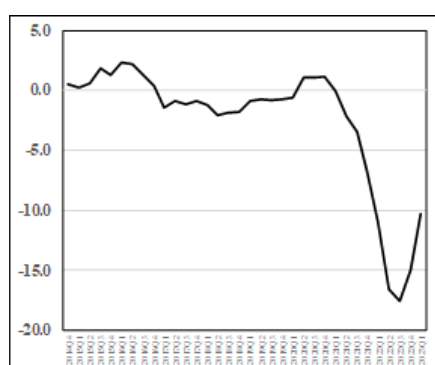
Source: CBBH

Chart 2 - Terms of Trade (*tt*) Q4 2014 – Q1 2023



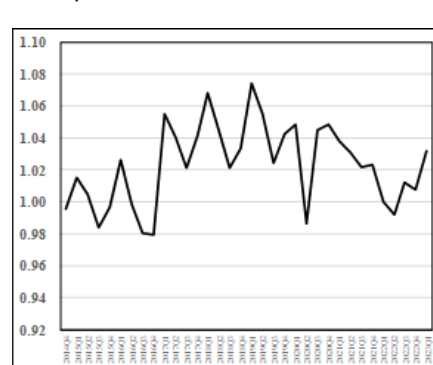
Source: BHAS

Chart 3 - Real Domestic Interest Rate, in % (*rdir*) Q4 2014 – Q1 2023



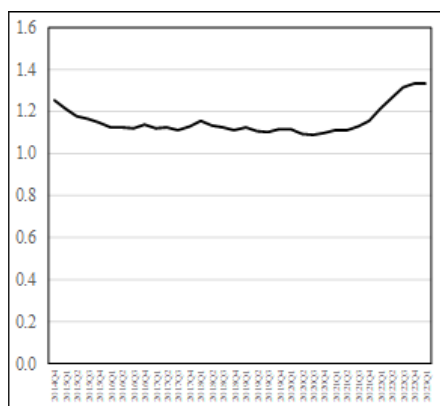
Source: CBBH (Adapted by the author)

Graph 4 - Difference in Productivity (*proddif*) Q4 2014 – Q1 2023



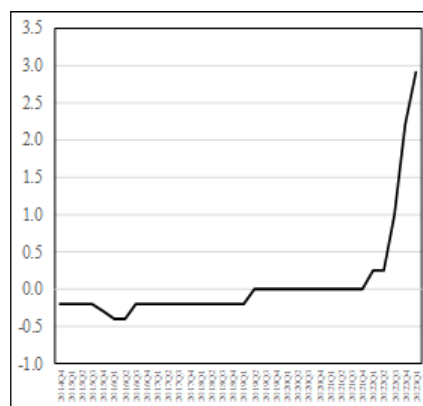
Source: BHAS (Adapted by the author)

Chart 5 - Difference in Other Prices (pothdif)
Q4 2014 – Q1 2023



Source: BHAS (Adopted by the author)

Chart 6 - Uncovered Interest Rate Parity,
in % (duip) Q4 2014 – Q1 2023



Source: BHAS and CBBH (Adopted by the author)

The research is full of numerous abbreviations (Table 2), some of them are less known and some are better known, but all of them make it easier to follow the results of the research, so we give them in the form of an overview.

Table 2 - Overview of abbreviations

Abbreviation	Explanation	Abbreviation	Explanation
CBBiH	Central Bank of Bosnia and Herzegovina	REER	Real Effective Exchange Rate
CPI	Consumer price index	REER_MRM	Estimation of REER based on MRM
<i>duip</i>	Deviation from uncovered interest rate parity	REER_VEC	Estimation of REER based on VECM
ECB	European Central Bank	REER_F_VEC	Forecast REER based on VECM
I(1)	Unit root	REER_F_MRM	REER forecast based on multiple regression model
IRP	Interest rate parity	RMSE	Root mean square error
KM, BAM	BH currency, convertible mark	Theil	Theil coefficient of inequality
KV	Cointegration vector	tt	Terms of exchange
<i>l_reer</i>	The logarithm of the real effective exchange rate	<i>duip</i>	Deviation from uncovered interest rate parity
LT_REER, EREER	Equilibrium, or long-term,	VAR	Vector autoregression
MAE	Mean average error	VECAM	Vector Error Correction Model
MAPE	Mean absolute percentage error	MRM	Multiple regression model
<i>pothdif</i>	The difference in other prices (other prices are consumer prices)	i_d	Domestic (BH) nominal interest rate - on excess bank reserves with the CBBH
<i>proddif</i>	The difference in productivity	i_f	Foreign nominal interest rate - on excess reserves with the ECB
<i>rdir</i>	real domestic (BH) interest rate		

Izvor: Autor

Results and Discussion

All variables have a unit root $I(1)$, they are not stationary, and the stationarity of variables is a basic condition for applying VAR (Table 3). Further modeling goes through testing the hypothesis of the existence of cointegration vectors when, if the hypothesis is confirmed, VECAM is used, and otherwise, the modeling of economic processes is performed using VAR with differentiated variables.

Table 3 - Augmented Dickey-Fuller Test

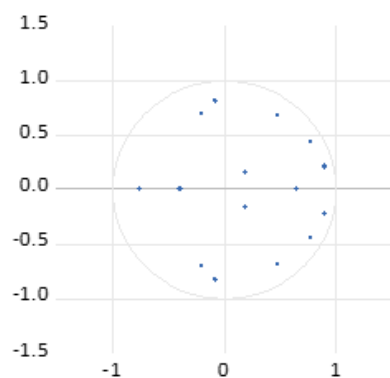
Variable	Variable Critical Test Value (5%) T Statistical Probability	T statistics	Probability
<i>l_reer</i>	-2.95	-2.22	0.20
<i>tt</i>	-2.95	-1.18	0.67
<i>rdir</i>	-2.95	-1.76	0.39
<i>pothdif</i>	-2.95	-1.48	0.53
<i>proddif</i>	-2.95	-1.42	0.56
<i>duip</i>	-2.95	1.36	1.00

Source: Author

The developed VAR model with five variables (*l_reer*, *tt*, *rdir*, *pothdif*, *proddif*) and a constant suggests two shifts according to one group of criteria (AIC and HQ), and according to another group of criteria four lags (FPE, LR), and we in order to avoid too many parameters (overparameterization) decided on a VAR with three shifts.

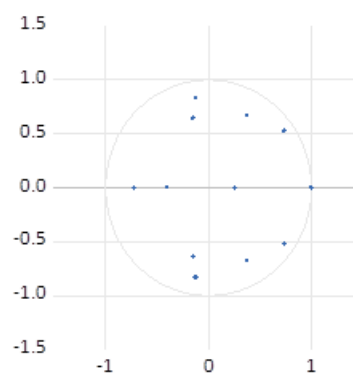
We tested the quality of the VAR model through the test of homoscedasticity of residuals, the test of serial correlation, the test of the normal distribution of residuals, and the distribution of eigenvalues. It is not possible to reject the null hypothesis of a normal distribution of residuals (Jarque Bera of 5.75 and 10 degrees of freedom gives a probability of 0.83) as well as the hypothesis of the absence of serial correlation (all F statistics for a given number of degrees of freedom give a probability above 0.14). Heteroscedasticity of the residuals, which gives an ineffective assessment of the parameters of the basic set, cannot be proven, because the common Chi-square statistic of 454 for 450 degrees of freedom and probability of 0.43 does not reject the null hypothesis of homoscedasticity of the residuals, and high probability is also given by the test of individual components. A key indicator of satisfactory model diagnostics is the degree of model stability. Both the VAR model and the VECAM model based on it are stable (Graph 7 and Graph 8). The companion roots of the matrix are the eigenvalues. For the VAR and VECAM model to be stable, the eigenvalues must lie within the unit circle, and this condition is met.

Chart 7 - Distribution of Eigenvalues for the VAR Model



Source: Ibid

Chart 8 - Distribution of Eigenvalues for the VECAM Model



Source: Ibid

The number of lags in the VECAM model is one less than in the VAR, and Johansson's cointegration test based on the restrictive cointegration test rejects the hypothesis of zero cointegration vectors (Table 4) and suggests the existence of at least one cointegration vector.

Table 4 - Non-restrictive rank cointegration test (maximum eigenvalue)

Hypothesis	Eigenvalues	Maximum eigenvalue	Critical value at the significance level of 0.05	Probability
None KV *	0.68	38.70	33.88	0.01
Most 1 KV	0.48	22.15	27.58	0.21
Most 2 KV	0.38	16.05	21.13	0.22
Most 3 KV	0.25	9.65	14.26	0.24
Most 4 KV	0.06	2.24	3.84	0.13

Source: *Ibid.* Note: CV – cointegration vector

All coefficients in the cointegration vector (Table 5) have a t statistic that rejects the null hypothesis of the coefficients' insignificance. In the short-term equation, the variables of the cointegration vector, which represents the equilibrium or long-term REER from the aspect of fundamental factors, enter with a minus sign (the underlined part of formula 1) and with one lag, which corrects the short-term deviation of REER from its long-term trend. The speed of adjustment depends on the size of the adjustment coefficient, which is -0.24 (Formula 1), causing the adjustment to last almost exactly four quarters (1/0.24). With an extremely high level of reliability (t value of -1.84), the hypothesis that the value of the adjustment coefficient is zero was rejected.

Table 5 - Cointegration vector

	$L_{reer}(-1)$	$tt(-1)$	$rdir(-1)$	$proddif(-1)$	$pothdif(-1)$	c
Coefficient	1	0.79787	-0.00481	-0.39462	-0.24391	-4.71
Standard error		-0.16	0.00	-0.14	-0.06	
t statistic		-4.90	4.30	2.75	4.06	

Izvor: *Ibid*

Formula 1 - Short-term REER equation corrected with long-term imbalance equation

$$D(L_{REER}) = -0.24*(L_{REER}(-1) + 0.797*TT(-1) - 0.0048*RDIF(-1) - 0.394*PRODDIF(-1) - 0.244*POTHDIF_K(-1) - 4.708) - 0.125*D(L_{REER}(-1)) - 0.061*D(L_{REER}(-2)) + 0.247*D(TT(-1)) + 0.282*D(TT(-2)) - 0.003*D(RDIF(-1)) - 0.002*D(RDIF(-2)) - 0.145*D(PRODDIF(-1)) - 0.107*D(PRODDIF(-2)) + 0.098*D(POTHDIF(-1)) - 0.093*D(POTHDIF(-2)) - 0.0028$$

The good diagnostics of the VAR model were also transferred to VECAM (Table 6). The LM test with all probabilities significantly above 5% does not allow rejection of the null hypothesis of no serial correlation, and the variance of the residuals is homoscedastic (Chi squared statistic of 331.8 for the number of degrees of freedom of 330 gives a probability of 0.46).

The statistic of the joint Jarque-Bera test for kurtosis and symmetry of the distribution has a value of 11.8 and for 10 degrees of freedom gives a probability of 0.29, significantly higher than the threshold for rejecting the null hypothesis of a normal distribution of residuals (0.05).

Table 6 - Serial correlation tests and heteroscedasticity tests for VECAM*

Breusch-Godfrey LM serial correlation test				Breusch-Pagan-Godfrey heteroskedasticity test			
F-statistics	0.41	Prob. F(4,24)	0.80	F-statistics	0.78	Prob. F(5,28)	0.57
Obs*R ²	2.20	Prob. Hi square (4))	0.70	Obs* R ²	4.14	Prob. Hi square (5)	0.53

Source: *Ibid*

*Note: The null hypothesis is defined in such a way that there is no serial correlation, and that the distribution of residuals is homoscedastic. Obs. – number of observations. R – coefficient of determination, Prob. - probability.

From the cointegration vector, the equilibrium REER equation (LT_REER) is obtained by changing the sign in front of the coefficient of the equation (Formula 2). All variables have the expected sign, except for the variable that describes terms of trade (tt). Faster growth of the domestic interest rate comparing to foreign interest rate (rdir) leads to an increase in the demand for the convertible mark and to an appreciation of the REER, as well as a faster growth of productivity in BH foreign trade partners in relation to BH (proddif), so the coefficients in front of these variables are positive. There is also a direct correlation between the difference in domestic and foreign prices (pothdif) and the fall in the value of this variable, the slower growth of domestic than foreign prices, causes REER depreciation. The negative value of terms of trade considering the characteristics of the BH economy has an economically logical and acceptable explanation.

In most countries, the faster growth of export than import prices leads to an appreciation of the exchange rate, because the faster growth of the value of exports than imports increases the demand for the domestic currency, i.e. currency of the exporter, and this causes appreciation of the nominal exchange rate and through it, if everything else is equal, appreciation of the REER. Bosnia and Herzegovina has a fixed exchange rate against the euro, and about 50% of its exports go to the eurozone, and the faster growth of export prices than import prices cannot change the nominal KM exchange rate. The change in bilateral nominal KM exchange rates in foreign trade with countries outside the eurozone is not only influenced by export-import prices but also by changes in the exchange rates of these countries to the euro, which are then transferred to the exchange rate of the convertible mark to the currencies of these countries.

The deficit of the current account of the balance of payments of BH, and thus the foreign exchange balance, is chronic and high, and therefore the improvement of terms of exchange with foreign countries has a marginal effect on REER appreciation, and the effect can be quite the opposite for the following reason. If the growth of export prices and the growth of the CPI are approximately the same, then the faster growth of export prices than import prices, through the slower growth of import prices than the CPI, reduces inflationary pressures in BH and leads to REER depreciation, which explains the negative value of the coefficient for terms of exchange. On the other hand, worsening terms of trade, and slower growth of BH export prices and faster growth of import prices, increase inflation and cause REER appreciation.

Formula 2. Equilibrium REER of convertible marks

$$l_reer = -0,79 * tt + 0,0048 * rdir + 0,39 * proddif + 0,24 * pothdif + 4,71$$

In the entire observed period, REER deviates from EREER, and the value of the deviation increases during the pandemic (Q2 2020 – Q1 2022) and in the time of high inflation (Q2 2022 – Q1 2023).

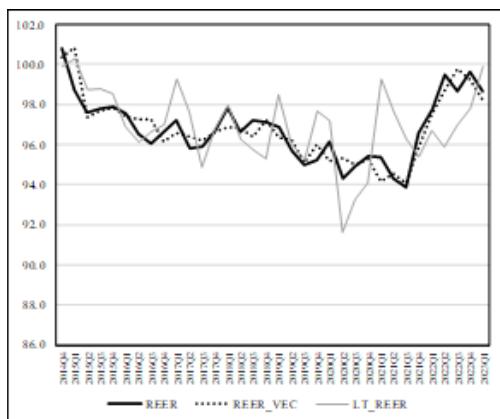
In these two periods, the standard deviation of the departure of REER from EREER is significantly higher than the standard deviation in the entire period before the outbreak of the coronavirus pandemic (Table 7). Periods of extraordinary global economic circumstances increase the size of the deviation of REER from its equilibrium value compared to the period when there were no global economic disturbances. Both the minimum and maximum deviation values are higher in crisis periods, and the range between these values is up to two times larger during periods of global economic disturbances. The REER of the convertible mark deviated the most from the equilibrium REER in the period of the coronavirus pandemic when the highest volatility measured by deviation, extreme values, and their range was recorded.

Table 7 - Departure of REER From its Equilibrium Value (LT_REER)

	Absence of global economic disruptions	Coronavirus pandemic	Rising inflation	Pandemic and rising inflation
Period	Q4 2014 - Q1 2020.	Q2 2020 - Q1 2022.	Q2 2022 - Q1 2023.	Q2 2020 - Q1 2023.
Standard deviation (1)	1.2	2.7	2.0	2.5
Maximum value (2)	1.9	2.9	3.7	3.7
Minimum value (2)	-2.5	-4.0	-1.2	-4.0
Range (4= 2-3)	4.4	6.9	4.9	7.7

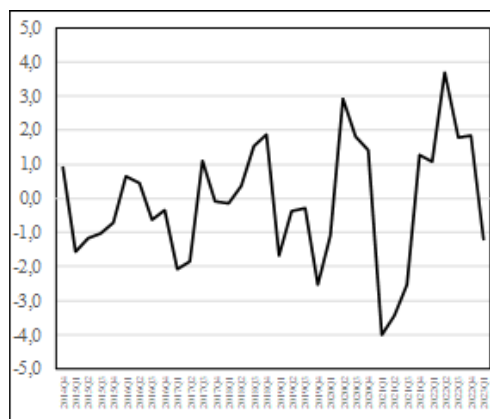
Source: *Ibid*

Chart 9 - REER and Equilibrium REER, Q4 2014 – Q1 2023, 2015 = 100



Source: *Ibid*

Chart 10 - Deviation of REER from Equilibrium REER, in %



Source: *Ibid*

The assessment of the REER movement was performed based on a multiple regression model (MRM) that has five independent variables and which, unlike VECAM, also includes the duip variable - deviation from the uncovered interest rate parity (Table 8). With these five variables, 87% of the variability of REER is explained, while the model diagnostics themselves show the quality of the selected model specification. The hypothesis of the absence of autocorrelation cannot be rejected (the value of the Q statistic gives a probability of 0.55 and above), as well as the hypothesis of a normal distribution of the residuals (the value of the Jarque Berra statistic is 0.37 and the probability of 0.83). In the multiple regression model, there is no serial correlation and no heteroskedasticity. Neither the assumption of non-existence of serial correlation nor the assumption of homoscedasticity of the residuals can be rejected - the calculated statistics give very low probabilities.

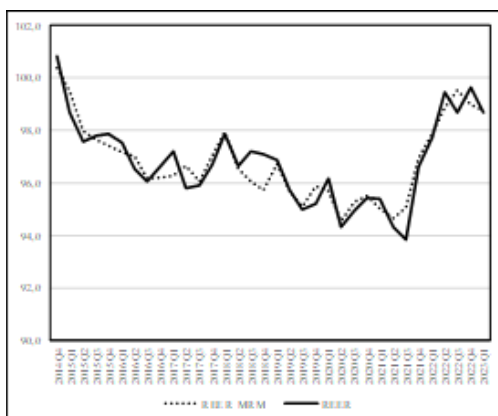
Table 8 - Multiple regression model, dependent variable I_{reer}

	Coefficient	Standard Error	T-statistic	Probability
c	4.20	0.09	44.57	0.000
$tt(-3)$	-0.163	0.05	-2.97	0.006
$rdir$	0.001	0.00	2.85	0.008
$proddif$	0.113	0.05	2.27	0.030
$pothdif$	0.367	0.03	10.79	0.000
$duip$	-0.017	0.00	-6.01	0.000

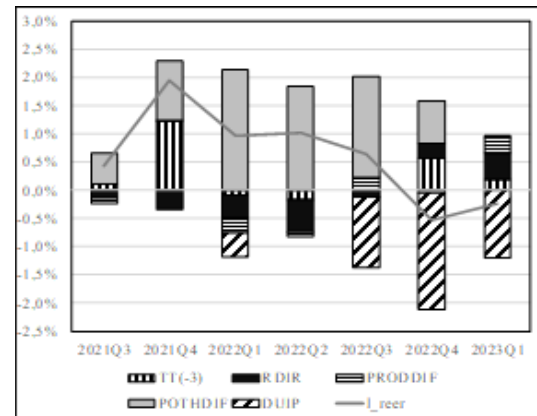
Source: *Ibid*

The REER assessment based on the multiple regression model (MRM) and its decomposition indicate the determinants of REER (Chart 11). Until the end of 2022, the key positive contribution to the growth-appreciation of REER is the faster growth of domestic than foreign consumer prices (Graph 12). In the last two quarters, due to a decrease in inflation, the contribution of the real domestic interest rate ($rdir$) is positive, as well as the terms of exchange (fall in import prices) and differences in productivity. A stronger appreciation of REER was prevented by the difference in uncovered interest rate parity ($duip$) with a pronounced negative contribution to changes in REER. Namely, the first major difference between the foreign (council) and BH (lower) interest rates, in the period of rising inflation, appeared in the first quarter of 2022, when the interest rate on excess reserves of banks at the ECB was -0.5%, and the interest rate on excess reserves at the CBBH was -0.75%, creating an uncovered interest rate parity. According to the theory of covered interest rate parity, to prevent permanent interest rate arbitrage (borrowing in a currency with a lower interest rate (BH) and investing in a currency with a higher interest rate (Eurozone)) the currency in the first country should appreciate, and the currency in the second country to depreciate. In the regime of a fixed exchange rate, this process of closing interest arbitrage (carry trade) is not possible and the EURKM exchange rate of 1.95583 is higher than the one required by the covered interest rate parity. This leaves the BH currency undervalued, which is equal to the depreciation of the nominal exchange rate, which affects the depreciation of the REER convertible mark. Therefore, the relationship between uncovered interest rate parity and REER is inverse - its rise lowers (depresses) REER, and its fall increases (appreciates) REER. There is another, economic, explanation of the inverse relationship between the difference between foreign and domestic interest rates, and REER, according to which the growth of this difference increases the net outflow of funds from BH and, reduces the credit potential of banks, reduces credit growth and money supply (M1 and M2). Less than potential money supply growth creates less pressure on prices, depressing the REER (all else being equal).

Graph 11 - REER i REER_MRM, 2015 = 100

Source: *Ibid*

Graph 12 - Contributes to Change in REER_MRM

Source: *Ibid*

The described mechanism of action of the deviation from the uncovered interest rates parity in the fixed exchange rate regime, i.e., much faster growth of the foreign than BH interest rates without the possibility of appreciation of the nominal exchange rate EURKM intensively affects REER in the second half of 2022 and in the first quarter of 2023. On average, during these three quarters, the foreign interest rate is higher than BH interest rates by 129 b.p., and since there is no appreciation of KM to the euro, the existing fixed exchange rate has a stimulating effect on REER depreciation, so the contribution of uncovered interest rate parity to the movement of REER is markedly negative.

Since the beginning of the accelerated growth of inflation, the REER appreciation of the convertible mark has been determined firstly by the faster growth of BH consumer prices, a drop in productivity, a worsening of terms of trade, and, finally, the growth of BH real interest rates. Due to the accelerated growth of ECB interest rates, and the extremely low degree of restrictiveness of BH monetary policies and the interest rate differentials produced by such monetary policies, the impact of duip on REER depreciation becomes more and more pronounced.

Based on the formed models for the period Q1 2014 - Q1 2023, we made a forecast of the REER movement for one period (quarter) outside the sample. In the sample, the multiple regression model has a better REER rating and a smaller forecast error than VECAM (Table 9) by all indicators (RMSE, MAE, MAPE, Theil). However, out of the sample (Q2 2023), REER_F_VECAM gives a slightly better forecast than the multiple regression model i.e. from REER_F_MRM (Table 9), and the value of the combined forecast, obtained from the average of these forecasts, is at the level of the realized REER in the second quarter of 2023.

Table 9 - REER Estimation Indicators, Q1 2014 – Q1 2023

	RMSE	MAE	MAPE	Theil
MRM	0.00622	0.004891	0.106918	0.00068
VECAM	0.007394	0.005756	0.125782	0.000808

Source: *Ibid*

Table 10 - REER and Forecast REER for Q2 2023

	RERR	REER_F_VEC	REER_F_MRM	Kombinovana prognoza
	98.0	96.8	99.3	98.1
Forecast error (Forecast in relation to REER)	-	-1.1%	1.4%	0.0%

Source: *Ibid*

Concluding Considerations

In the fixed exchange rate regime, one of the acceptable methods of determining foreign trade competitiveness is the change in the real effective exchange rate. REER is presented as the sum of bilateral exchange rates of foreign trade partners weighted by the ratio of foreign and domestic prices and is expressed in the form of a base index, in such a way that growth represents its appreciation, and decline represents its depreciation. Its value can also be determined based on fundamental economic variables, and the REER obtained in this way represents an equilibrium or long-term REER, which, depending on the movement of its fundamental economic determinants, can deviate significantly from the current REER values.

The equilibrium REER of the convertible mark is derived from the cointegration vector of the VECAM model made up of five variables: REER, terms of trade, real BH interest rate, and difference in productivity, and difference in other prices (CPI).

The REER assessment for the period Q4 2014 - Q1 2023 and the REER forecast for one period-quarter out of the sample was derived based on the constructed VECAM model, as well as based on a multiple regression model, to which the variable deviation from uncovered interest rate parity was added.

During the period of the coronavirus pandemic and the accelerated growth of inflation, the volatility of the deviation of the REER of the convertible mark from the equilibrium REER is much higher than in the period when there were no global economic disturbances.

The main cause of the sudden REER appreciation that started at the end of 2021 is primarily the faster growth of BH consumer prices from foreign consumer prices. The difference in consumer prices created appreciation pressures, while the difference in interest rates affected REER depreciation. Until the third quarter of 2022, the domestic real interest rate caused a drop in REER (depreciation), and after its growth, it increased REER. From the middle of 2022, the deterioration of terms of trade, which acts with a lag, appreciates the value of REER (due to faster growth of import prices than export prices). Also, from the middle of 2022, the faster growth of productivity abroad compared to BH has made a positive contribution to the REER value.

The REER forecast for the second quarter of 2023, calculated as the average of the obtained forecast using the VECAM model and the multiple regression model, is identical to the realized REER value. Arithmetic mean forecast smoothed out the errors in individual model forecasts and gave a more accurate forecast value than that given by individual models, demonstrating the higher quality of the combined forecast compared to the forecast obtained based on individual models.

From the obtained research results, it is possible to make proposals to the creators of economic policy in Bosnia and Herzegovina aimed at preserving foreign trade competitiveness based on the movement of REER and its deviation from the equilibrium value. The key reason for REER appreciation is the faster growth of BH consumer prices than those abroad, and that is why anti-inflation policy should be the basis of any future economic policy in Bosnia and Herzegovina.

Productivity as the basic economic principle of business, and in connection with its slower growth in BH compared to the environment, must be subject to constant improvement and growth, to avoid appreciation pressures on REER. The growth of interest rates in Bosnia and Herzegovina was either through the growth of BH real interest rates, or through the reduction of uncovered interest rate parity to reduce the outflow of capital from BH, exposes REER to appreciation. However, the monetary policy conducted through the increase of BH interest rates would not have a high degree of efficiency due to the extremely high liquidity of the BH banking sector (excess reserves in Q3 2023 make up 7.8% of the assets of BH banks), the absence of loans from the Central Bank of BH, and the impossibility of sterilization of primary money.

From the moment when CBBH started reducing interest rates (July 2016) until December 2022, the net foreign assets of the BH banking sector (claims against non-residents minus obligations towards non-residents) increased from 75 million KM to 3.12 billion KM (7% of GDP), and if one wants to avoid the REER appreciation that leads to the growth of BH interest rates, then instead of increasing interest rates, it is better to balance this unfavorable foreign exchange balance through an increase in required reserves, or by direct or indirect, prudential regulation of the exposure of BH banks abroad.

Terms of trade, measured as the ratio of BH export prices and import prices, do not act in such a way that their improvement (faster growth of export prices than import prices) appreciates the exchange rate of KM (due to the greater supply of foreign exchange on the BH market). It seems that for depreciation of the REER exchange rate, in the context terms of exchange, the most important thing is that import prices grow more slowly than export prices. Since every global price shock (increase in import prices) leads to an increase in prices in BH and REER appreciation (all other things being equal), BH needs to absorb such negative external shocks through an effective anti-inflationary policy and increase in productivity.

Given that the multiple regression model gives a very good assessment of the equilibrium real effective exchange rate, where the equilibrium REER means the REER determined by fundamental factors, future research could move towards determining the theoretical value of the REER that reduces the current account balance of BH to zero. Based on the thus obtained theoretical REER, which removes the negative balance of the current account, it is possible to determine its components, i.e., the composition needed to balance the current account of the balance of payments. The obtained results of these prospective studies would represent a solid theoretical basis for designing a policy of balancing the current account balance of Bosnia and Herzegovina, which has been chronically high for years.

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DETERMINANTE TRŽIŠTA NEKRETNINA U REPUBLICI SRBIJI: PREGLED I NALAZI

Prof. dr Almir Alihodžić

redovni profesor, Ekonomski fakultet Univerziteta u Zenici
almir.dr2@gmail.com

Rezime: Promene vrednosti na tržištu nekretnina utiču, kako na kvalitet kreditnih portfolija banaka, tako i na finansijsku stabilnost i realnu ekonomiju. Republika Srbija je jedna od zemalja koja se suočava sa uzlaznim trendom potražnje za stanovanjem. Ovaj rad istražuje uticaj makroekonomskih i bankarskih varijabli na indeks cena nekretnina u Srbiji za period od 2014. do 2023. godine na kvartalnom nivou. Takođe, u ovom istraživanju se primenjuje panel regresiona i korelaciona analiza. Odabrane nezavisne (eksplanatorne) varijable su bruto domaći proizvod, indeks potrošačkih cena, kamatna stopa na bankarske kredite, odnos kursa domaće valute prema evru i štednja stanovništva. Rezultati istraživanja su pokazali da je najsignifikantniji uticaj na indeks cena nekretnina imala nezavisna varijabla indeks potrošačkih cena. S druge strane, najznačajniji negativni uticaj na zavisnu varijablu (indeks cena nekretnina) su imale sledeće nezavisne varijable: kamatna stopa na bankarske kredite i devizni kurs domaće valute u odnosu na evro.

Ključne reči: Indeks cena nekretnina, makroekonomske varijable, bankarske varijable, Shapiro Wilk test, Breusch – Pagan test, regresiona analiza, Hausman test.

JEL klasifikacija: R30, E31, G51

Uvodna razmatranja

Smeštaj i stanovanje se smatraju osnovnim ljudskim potrebama. Da bi se to postiglo građanska je obaveza svake zajednice da pomogne ljudima u upravljanju adekvatnim smeštajem. Na taj način, Vlada pokušava da obezbedi pristup prilagođen potrošačima kako bi uspeła da realizuje svoje odluke na stambenom tržištu. Da bi se privreda razvijala u pravom smeru, važno je uspostaviti ravnotežu između potražnje i dostupnosti stanovanja (Rozin, 2020).

Dakle, stanovanje je glavna komponenta bogatstva domaćinstava i jedan od glavnih pokretača privatne potrošnje (Mian i ostali, 2013). Štaviše, stambena tržišta su veoma relevantna za finansijsku stabilnost, pošto su mehurići cena stanova istorijski bili dramatično štetni događaji. S tim u vezi je procena trendova i rizika na stambenim tržištima ključna za centralne banke (Jorda i ostali, 2015). Odabir prave kombinacije politika zavisi od dostupnosti detaljnih i pravovremenih informacija o potražnji i ponudi stambenih objekata. Na primjer, kreatori politike mogu želeći da odaberu različite politike u zavisnosti od toga da li je prekomeran rast cena stanova posledica bujanja na strani potražnje ili niske ponude.

Razvoj stambenog tržišta određuju mnogi usko povezani ekonomski, pravni, finansijski, institucionalni i politički faktori. Oni se mogu kvantifikovati prvenstveno međunarodnim terminima, gde makroekonomski faktori kao što su bruto domaći proizvod (BDP), inflacija, stope prinosa, te dostupnost hipotekarnih kredita igraju značajnu ulogu. Postoji nekoliko faktora koji utiču na potražnju, generalno bez obzira na lokalne varijacije. To mogu biti različiti uzroci i administrativno-politički, pravni i ekonomski mehanizmi, kao što su stambena politika državnih organa, postojeći sistem kredita i mogućnosti njihovog dobijanja, stopa inflacije i drugi (Hott i ostali, 2008).

Cijene stanova su u korelaciji sa kretanjima poslovnog ciklusa i u širokom spektru stvarnih varijabli, kao što su investicije i potrošnja. U vezi sa ovim atributima, sektor nekretnina u mnogim zemljama je postao jedan od ključnih sektora privrednog rasta i razvoja. U poslednjoj deceniji, posebno u većini industrijskih zemalja cene stanova su dramatično porasle zbog niskih dugoročnih kamatnih stopa, ekonomskog rasta i velike likvidnosti (Ahearne i ostali, 2005).

Vitalna pitanja stanovanja i razvoja privrede su dobila veliku pažnju u poslednje dve decenije. Globalna finansijska kriza iz 2008. godine pokazala je značajnu povezanost između stanovanja i privrede. To je takođe bila verovatno jedna od najgorih finansijskih kriza u SAD-u koja je formirala super stambeni balon na globalnom tržištu nekretnina. Nakon kolapsa tržišta nekretnina u SAD-u ili krize subprimarnog tržišta iz 2008.-2009. god., došlo je do oživljavanja fokusa na tržištu nekretnina. Tržište nekretnina ima dvostruku ulogu i to kao potrošačko dobro i kao investicija, što je prepoznato u literaturi (Leung, 2004). Pandemija COVID-19 je dodatno promenila i stvorila određene sopstvene trendove cena nekretnina.

Proteklih godina u Republici Srbiji povećan je promet na tržištu nekretnina, što je bilo u skladu sa kretanjima na ovom segmentu tržišta, kao i u drugim zemljama. Dakle, promet je bio veći u 2022. godini za 22% u odnosu na 2021. godinu. Na data tržišna kretanja uticalo je više faktora kao što su: povećana tražnja za nekretninama koja je pre svega bila refleksija pozitivnih kretanja na tržištu rada, povoljni uslovi kreditiranja, niske kamatne stope, potraga za alternativnim investicijama, povećan rad od kuće usled pandemije i drugi faktori (Narodna banka Srbije, 2022).

Osnovni cilj ovog istraživanja je da utvrdi u kojoj meri i kojim intenzitetom odabrane makroekonomske i bankarske varijable utiču na kretanje indeksa cena nekretnina u Republici Srbiji. Nulta hipoteza podržava model slučajnih efekata. S druge strane, alternativna hipoteza podržava model fiksnih efekata. U radu će se testirati sledeće hipoteze:

H0: Nulta hipoteza: Model slučajnih efekata je odgovarajući

H1: Alternativna hipoteza: Model fiksnih efekata je odgovarajući

Hipoteze u ovom istraživanju će se testirati uz pomoć Hausmanovog testa.

Rad je strukturiran iz šest delova. Prvi deo odnosi se na uvodna razmatranja sa akcentom na važnost tržišta nekretnina, cilj istraživanja i postavljene hipoteze. Drugi deo opisuje pregled dosadašnjih istraživanja u kontekstu uticaja različitih demografskih, socijalnih, makroekonomskih i bankarskih indikatora na kretanje indeksa cena nekretnina i drugih relevantnih indikatora na tržištu nekretnina. Treći deo ukratko analizira stanje na tržištu nekretnina u Srbiji kroz prizmu odabranih indikatora na tržištu nekretnina. Četvrti deo opisuje izabranu metodologiju istraživanja sa fokusom na model fiksnih efekata i model slučajnih efekata. Peti deo odnosi se na podatke potrebne za analizu. Šesti deo predstavlja dobijene rezultate istraživanja, kao i određena zapažanja i preporuke.

Pregled relevantne literature

Raznovrsnost cena i aktivnosti stambenog tržišta na regionalnom nivou proističe pre svega iz raznovrsnosti socioekonomskih faktora i društvenih procesa. Posebna pažnja u mnogim radovima je posvećena demografskim faktorima koji uključuju godine starosti, pol, bračni status, i koji utiču na stambene potrebe. Demografska situacija se može promeniti kao rezultat migracije, kako između država, regiona, tako i pojedinačnih gradova (Annas i ostali, 1984).

Mnogi autori su proučavali odnos između demografije i tržišta nekretnina. Povećanje broja novorođenčadi ima mali kratkoročni efekat na stambeno tržište, ali povećava potražnju za novim kućama dvadeset godina kasnije. Smanjenje broja rođenih ili povećanje prosečne starosti stanovništva snažno utiče na tražnju i na cene stanova (Mankiw i Weil, 1989).

Značajan udeo rashoda za stanovanje u budžetima domaćinstava ima za posledicu tesnu korelaciju između rasta prihoda u datoj oblasti i rasta cena stanova (Reichert, 1990). Rezultati empirijskog istraživanja prema Galinu (2006) ukazuju na to da zbog niske fleksibilnosti prihoda stambenog tržišta dati odnos može biti diskutabilan u mnogim slučajevima.

Prihodi stanovništva su usko povezani sa tržištem rada, te su pored prihoda i mogućnosti zapošljavanja važan potencijal regije, što rezultira povećanjem lokalnih cena stanovanja. Takođe, postoje i očekivanja da će povećanje procenta nezaposlenih u ovoj oblasti uticati na smanjenje cene stanova (Berg, 2002).

Ekonomski faktori uključuju ne samo prihode stanovništva i tržište rada već i stanje lokalne privrede. Ovo se može odraziti na indikator poput lokalnog BDP-a, iako empirijska istraživanja sprovedena na kanadskom tržištu pokazuju da odnosi koji su sasvim logični i očigledni, nisu uvek potvrđeni u praksi. Isto tako značajni su i pokazatelji koji proizilaze direktno sa tržišta nekretnina, a odnose se na ravnotežu ili neravnotežu između ponude i potražnje (Allen i ostali, 2009).

Nivo razvijenosti stambenog tržišta odražava ekonomsko stanje domaćinstava, koje zavisi pre svega od stabilnosti prihoda. Dakle, na efektivnu tražnju, te kao rezultat toga i na cenu stanova u velikoj meri utiču finansijski resursi domaćinstava, kao što su štednja i raspoloživi prihod (Lin i ostali, 2014).

Makroekonomski faktori su od kapitalnog značaja u razumevanju kretanja cena na tržištu nekretnina. Prema Irandoustu (2019) cene stambenih nekretnina određene su zakonom ponude i potražnje, što dalje znači da svaki faktor koji utiče na navedeni zakon ima uticaj i na određivanje cena mesta stanovanja. S tim u vezi, makroekonomski faktori mogu imati odlučujući uticaj u kontekstu utvrđivanja precenjenosti ili podcenjenosti vrednosti stambenih nekretnina.

Kau i Keenan (1980) sprovedli su odgovarajuću studiju o odnosu kamatnih stopa i cena stanova. Došli su do zaključka da povećane kamatne stope uglavnom utiču na smanjenje potražnje na tržištu nekretnina, te konsekvntno deluju na smanjenje cene stanova. Suprotno od Kau i Keenan, Geoffrei (2002) i Ahearne i ostali (2005) veruju da će sa porastom kamatnih stopa troškovi investiranja u razvoj nekretnina rasti, a profiti opadati, što bi indirektno dovelo do smanjenja ponude nekretnina, i konačno do rasta cena nekretnina.

Takođe, Pillaiyan (2015) je pronašla inverznu vezu između kamatne stope i cene stanova u Maleziji i tvrdila je da je niska kamatna stopa podstakla balon u cenama nekretnina. Isto tako, navela je da svako povećanje kamatnih stopa na kratak rok dovodi do odgovarajuće promene u ceni stanova.

Lin i ostali (2014) koristili su dvadeset lokalnih indikatora, uključujući starost stanovništva, procenat brakova, obrazovanje, nezaposlenost, bezbednost, kvalitet vazduha itd. Rezultati istraživanja su pokazali da se tržišna vrednost merena brojem transakcija pokazala kao destimulirajuća mera prosečne cene stanova.

Belke i Keil (2018) sažimaju četiri pristupa varijablama koje utiču na cene stambenih nekretnina. Naime, prvo, pristup cenama imovine koji povezuje cene nekretnina sa budućim diskontovanim prihodima. Drugo, fokusira se na pristupačnost i održivost cena stanova ili drugih privatnih domaćinstava. Dato se analizira putem odnosa prihoda, zatim odnosa kredita i vrednosti indeksa, zatim odnos stvarnih mesečnih troškova hipoteke i prihoda. Treće, postoji hedonistički metod određivanja cena. To zapravo znači da hedonističko modeliranje cena uzima u obzir specifične karakteristike pojedinačnih objekata ili naselja, od kojih svaki doprinosi ukupnoj vrednosti nekretnine. Četvrto, postoje ekonometrijski modeli koji direktno procenjuju efekat cena nekretnina. Takvi modeli su zasnovani na nekom obliku nacionalnog, regionalnog ili lokalnog indeksa cena nekretnina kombinovanog u vremenske serije ili panel forme.

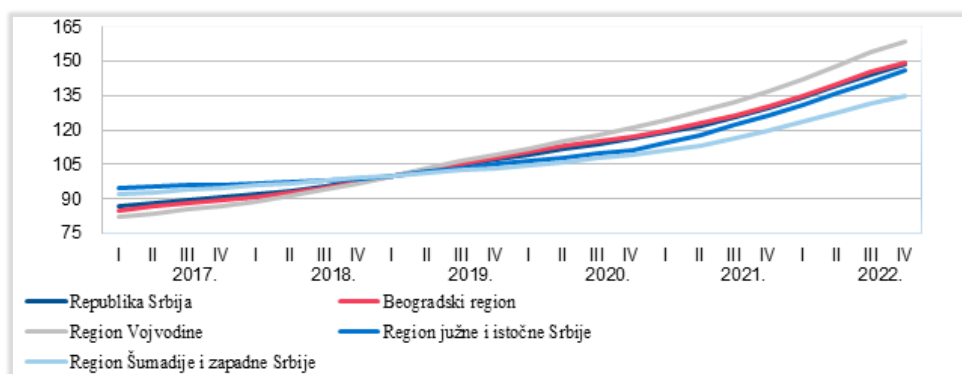
Trofimov (2018) u svom istraživanju pokazuje da dugotrajnim visokim ekonomskim rastom stambena gradnja može postati prekomerno stimulativna, gde dolazi do suviše gradnje gde se konsekvntno stvara veća ponuda stambenih nekretnina nego što je potražnja za istim. Dato rezultira padom cena nekretnina.

Tripathi (2019) u svom opsežnom istraživanju među različitim zemljama koristi random efekt model i sugerise da bi Vlada trebalo da prilagodi monetarnu politiku kao što su inflacija i ponuda novca, kako bi se obuzdale stvarne cene nekretnina. Takođe, Khoo i ostali (2019) proučavali su cene nekretnina u Maleziji, te na isti način preporučili da Vlada treba da pojača promociju stambenih cena kako bi se izbegla ubrzana inflacija. Stabilnost cena pomaže da se finansijsko-ekonomska aktivnost održi na zadovoljavajućem nivou. Dakle, politika stabilnosti cena je dragoceno sredstvo za snižavanje i stabilizaciju inflacije.

Analiza odabranih indikatora na tržištu nekretnina Republike Srbije

Indeks cena stanova razvijen je u skladu s međunarodnim smernicama, kao i na osnovu modela za masovnu procenu stanova, koji pored cena iz kupoprodajnih ugovora uzima u obzir i različite kvalitativne karakteristike nepokretnosti iz relevantnih izvora. Kretanje vrednosti indeksa daje uvid na kontinuirani trend rasta cena stanova tokom posmatranog perioda (Narodna banka Srbije, 2022). Grafikon u nastavku teksta ilustruje trend kretanja indeksa cena stanova na tržištu nekretnina u Republici Srbiji za period: 2017. – 2022. godine.

Grafikon 1 - Trend kretanja indeksa cena stanova u Republici Srbiji za period: 2017 – 2022. godine

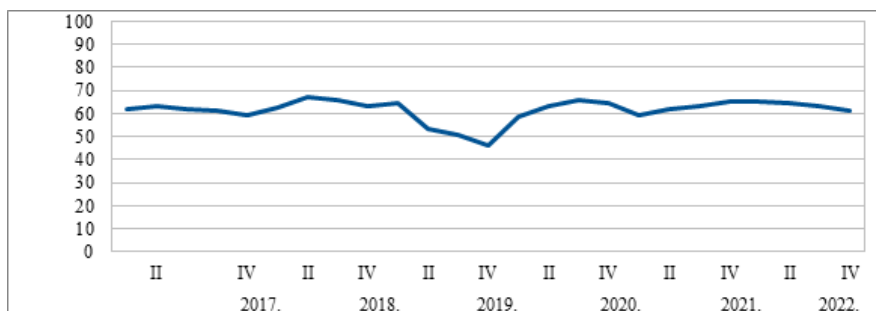


Izvor: www.nbs.rs (Preuzeto:16.01.2024.)

Indeks cene stanova na tržištu nekretnina u Republici Srbiji na kraju četvrtog kvartala 2022. godine iznosio je 148,79, što je više za oko 64% u odnosu na četvrti kvartal 2017. godine. Sa stanovišta regiona najviše su povećane cene stanova u regionu Vojvodine za oko 16,02% i grada Beograda za oko 14,91%. Kako se najveći broj procenjenih stambenih nepokretnosti odnosi na beogradski region, da se zaključiti da je prosečna procenjena vrednost po kvadratnom metru stambenih nepokretnosti u Republici Srbiji u najvećoj meri determinisana kretanjem vrednosti procena stambenih nepokretnosti u beogradskom regionu (Narodna banka Srbije, 2022).

LTV ratio (engl. Loan-to-Value) predstavlja pokazatelj odnosa vrednosti hipotekarnog kredita i vrednosti nepokretnosti koja služi za obezbeđenje datog kredita.

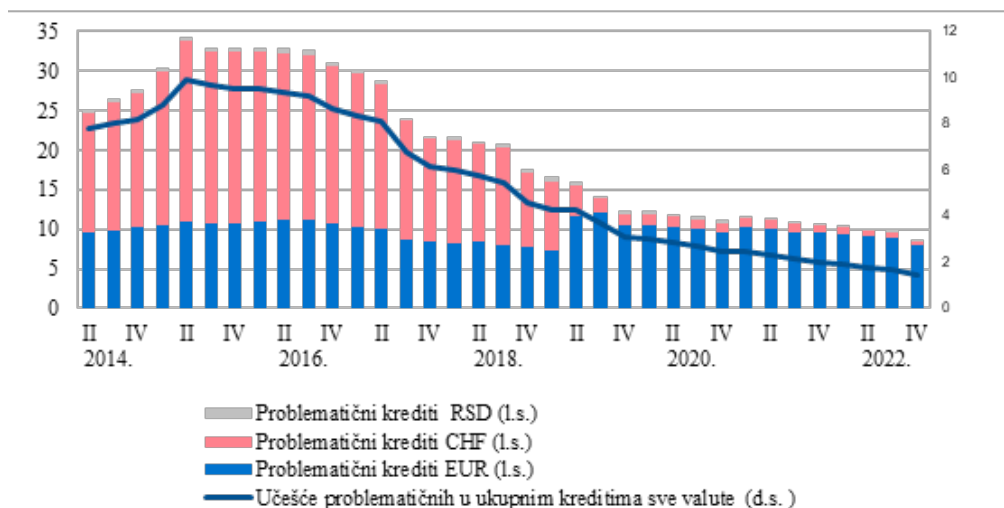
Grafikon 2 - Vrednost stambenih kredita za koje je hipotekovan stan u odnosu na procenjenu vrednost stanova - LTV ratio za period: 2017 – 2022. godine



Izvor: www.nbs.rs (Preuzeto:16.01.2024.)

Iz prethodnog grafikona se da primetiti da je vrednost LTV racija u poslednjem kvartalu 2022. godine iznosila 61,1%, što predstavlja relativno povećanje u odnosu na četvrti kvartal 2017. godine za oko 2,55%. Prosečna vrednost LTV racija je znatno ispod propisanog nivoa od 80%. U cilju obezbeđenja uslova za kvalitetniju procenu vrednosti nekretnina, što posledično utiče na smanjenje rizika nastanka novih problematičnih kredita, te razvoju tržišta problematičnih kredita Narodna banka Srbije od 2015. godine vodi bazu podataka o procenama vrednosti nekretnina koje su predmet hipoteke i o kreditima obezbeđenim hipotekom (Narodna banka Srbije, 2022).

Grafikon 3 - Problematicni krediti stambene izgradnje na tržištu nekretnina Republike Srbije za period: 2014 - 2022. godine



Izvor: www.nbs.rs (Preuzeto: 16.01.2024.)

Nepokretnosti su kao predmet obezbeđenja kredita vrlo zastupljene u bankarskom sektoru Republike Srbije. S tim u vezi je adekvatna procena vrednosti nekretnina od esencijalnog značaja jer su banke direktno izložene riziku promene tržišnih cena nepokretnosti. Iz prethodnog grafikona je vidljivo značajno smanjenje problematičnih kredita u 2022. godini koje je iznosilo oko 3.3% u odnosu na 2014. godinu gde je učešće iznosilo preko 20%. Razlozi različitih vremenskih razdoblja analize odabranih indikatora na tržištu nekretnina Republike Srbije i ekonometrijske analize su pre svega nedostatak domaće statistike posmatranih podataka.

Metodologija istraživanja

Ekonometrijsko modeliranje cene nekretnina korišćenjem socioekonomskih i ekoloških faktora ima relativno dugu tradiciju i često se opisuje u literaturi. Obimni pregled statističkih modela koji opisuju odnose između cene stanova i faktora koji na njih utiču na nacionalnom, regionalnom i lokalnom nivou predstavili su Gasparenje i ostali (2014) gde su naveli prednosti i nedostatke modela, kao i njihove strukturne elemente. Često se postavlja pitanje: zašto se koristi panel regresiona analiza i podaci u različitim studijama? Prednosti korišćenja panel analize i podataka su mnogobrojne. Hsiao (1985), Klevmarket (1989) i Solon (1989) naveli su nekoliko prednosti korišćenja panel podataka.

Štaviše, panel podaci daju više informativnih podataka, veću varijabilnost, manje kolinearnosti među varijablama i više stepena slobode, a samim tim i veću efikasnost.

Postoje tri tipa panel analitičkih modela koji se koriste, i to: (1) objedinjeni regresioni model, (2) model fiksnog efekta i (3) model slučajnog efekta. Objedinjeni regresioni model je jedan tip modela koji ima konstantne koeficijente koji se odnose i na preseke i na nagibe. Za ovaj model istraživači mogu da objedine sve podatke i pokrenu običan model regresije najmanjih kvadrata. Model fiksnog efekta su razlike između jedinica poprečnog preseka koje se mogu obuhvatiti razlikama u konstantnom terminu, a termin preseka regresionog modela varira u svim jedinicama poprečnog preseka. U modelu slučajnog efekta, pojedinačni efekti su nasumično raspoređeni po jedinicama poprečnog preseka i da bi se uhvatili pojedinačni efekti, regresioni model je specifikovan sa terminom preseka koji predstavlja ukupni konstantni termin (Seddi i Lawler, 2000).

Osnovni cilj ovog istraživanja je merenje ključnih makroekonomskih i bankarskih indikatora na promene cena nekretnina. Procene potencijalnih odrednica odnose se na postojeću literaturu. Ekonometrijski model predstavljen je na sledeći način:

$$\% \Delta HPI = \beta_0 + \beta_1 * (\% \Delta GDP) + \beta_2 * (\% \Delta CPI) + \beta_3 * (\% \Delta BCIR) + \beta_4 * (\% \Delta EXR) + \beta_5 * (\% \Delta HS) \quad (1)$$

Ekonometrijski model je model višestruke regresije, uključujući dve ili više objašnjavajućih (eksplanatornih) varijabli. Da bi se uzela u obzir razlika između posmatranih podataka i očekivane vrednosti dodaje se termin slučajne greške $\varepsilon_i = \% \Delta \text{ cena nekretnina} - E(\% \Delta \text{ Cena nekretnina})$, gde se jednačina novog ekonometrijskog modela može zapisati na sledeći način:

$$\% \Delta HPI = \beta_0 + \beta_1 * (\% \Delta GDP) + \beta_2 * (\% \Delta CPI) + \beta_3 * (\% \Delta BCIR) + \beta_4 * (\% \Delta EXR) + \beta_5 * (\% \Delta HS) + \varepsilon_i \quad (2)$$

Osnovna pretpostavka je da posmatrane vrednosti ekonometrijskog modela zadovoljavaju odnos populacije i da se pridržavaju strogih pravila egzogenosti, uslovno nekorelisanih grešaka i normalnosti grešaka. Osim toga, bitno je napomenuti da ne postoji apsolutno tačna linearna veza između eksplanatornih varijabli. Ukoliko je p – vrednost statistički značajna treba koristiti model fiksnog efekta. Posmatrano sa druge strane, ukoliko p – vrednost nije statistički značajna treba koristiti model slučajnog efekta. Test značajnosti je izveden za sve varijable korišćenjem t -testa pri nivou značajnosti od 95% (Chmelarova, 2007).

Podaci

Ovo istraživanje se fokusira na sledećim varijablama: zavisna varijabla će biti indeks cena nekretnina u Republici Srbiji (HPI), dok će se bruto domaći proizvod (GDP), indeks potrošačkih cena (CPI), kamatna stopa na bankarske kredite (BCIR), devizni kurs dinara prema evru (EXR) i štednja sektora stanovništva (HS) posmatrati kao nezavisne varijable. Izbor posmatranih varijabli za analizu je značajan rast cena i atraktivnost sektora nekretnina u Republici Srbiji, kao i pretpostavljena kauzalnost nezavisnih varijabli kao značajnih prediktora. Istraživanje obuhvata period od prvog kvartala 2014, do četvrtog kvartala 2023. 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 Narodne banke Republike Srbije, Republičkog zavoda za statistiku Srbije i Svetske banke. Merenje i očekivani efekat zavisne i nezavisnih varijabli dati su u tabeli 1.

Tabela 1 - Kratki opis zavisne i nezavisnih varijabli u modelu

Varijabla	Skraćenica	Očekivani efekat
Indeks cena nekretnina	HPI	
Bruto domaći proizvod	GDP	(+)
Indeks potrošačkih cena	CPI	(+)
Kamatna stopa na bankarske kredite	BCIR	(-)
Devizni kurs dinara prema evru	EXR	(-)
Štednja sektora stanovništva	HS	(+)

Izvor: Proračun autora

Indeks cena nekretnina (HPI) - meri promene cena stambenih nekretnina kao procentualne promene od nekog određenog početka datuma koji ima HPI od 100. Dakle, indeks cena nekretnina je indeksni broj za merenje nivoa kretanja cena stambene imovine (stanova, privatnih kuća, kuća u nizu, itd.) koju domaćinstva povremeno kupuju.

Bruto domaći proizvod (GDP) - je ukupna novčana ili tržišna vrednost svih gotovih dobara ili usluga proizvedenih unutar granica zemlje u određenom vremenskom periodu. Kao široka mera ukupne domaće proizvodnje, funkcioniše kao sveobuhvatan pokazatelj ekonomskog zdravlja posmatrane zemlje. GDP igra značajnu ulogu u formiranju cena stambenih nekretnina. Prema Razali i Tanu (2016) preferirani ekonomski rast podiže cene stambenih nekretnina.

Indeks potrošačkih cena (CPI) - je indeks cena, odnosno cena prosečne ponderisane tržišne korpe potrošačkih dobara i usluga koje kupuju domaćinstva. Promene u izmerenom CPI prate promene cena tokom vremena (<https://en.wikipedia.org>). Dakle, indeks potrošačkih cena je najčešće razmatrana mera inflacije. Generalno, povećanje CPI može izazvati povećanje cena građevinskog materijala, troškova rada i drugih operativnih troškova koji se odnose na izgradnju i održavanje stanova. U ovom istraživanju se pretpostavlja pozitivna korelacija između indeksa cena nekretnina i indeksa potrošačkih cena.

Kamatna stopa na bankarske kredite (BCIR) - kamata je novčana naknada za korišćenje pozajmljenog novca. Dakle, kamata je iznos novca koji zajmodavac ili finansijska institucija dobija za pozajmljivanje novca (<https://www.investopedia.com>). Kada kamatne stope rastu, paralelno rastu i troškovi zaduživanja, a potencijalni kupci se obeshrabruju. Kao rezultat toga, potražnja za stambenim nekretninama opada. Prema Andrews (2010) između cena nekretnina i kamatnih stopa postoji negativna korelacija, koja takođe zavisi i od stepena konkurencije u bankarskom sektoru. U ovom radu se pretpostavlja negativna korelacija između indeksa cena nekretnina i kamatnih stopa na bankarske kredite.

Devizni kurs dinara prema evru (EXR) - devizni kurs je kurs po kome će se jedna valuta zameniti za drugu valutu i utiče na trgovinu i kretanje novca između zemalja. Na kurseve utiču i vrednost domaće valute i vrednost strane valute (<https://www.investopedia.com>). Devizni kursevi mogu uticati na međunarodne tokove kapitala koji ulazi na tržište nekretnina. Ako kurs domaće valute opadne, cene imovine domaćeg tržišta nekretnina, kao što su stambeni objekti postaću jeftiniji za strane investitore, a uslovi poput ovog mogu povećati priliv kapitala u sektor nekretnina i podići cene nekretnina. U studiji se pretpostavlja negativna korelacija između indeksa cena nekretnina i deviznog kursa dinara prema evru.

Štednja sektora stanovništva (HS) - osnovni izvor bankarskog potencijala čine depoziti. Depozitni izvori čine preko tri četvrtine od ukupnih izvora bankarskih sredstava (Plakalović i Alihodžić, 2015). Ukupna štednja sektora stanovništva u bankama u Republici Srbiji nastavila je trend rasta jačajući depozitnu bazu bankarskog sektora (Narodna banka Srbije, 2022. god.).

Rezultati i diskusija

Rezultati deskriptivne statistike, korelacije, multikolinearnosti, normalne distribucije, homoskedastičnosti i heteroskedastičnosti, kao i regresije predstavljeni su u tabelama 2-9. Ukupan broj opservacija iznosi 40, što predstavlja relativno reprezentativan uzorak, kako sa stajališta dostupnih podataka na tržištu nekretnina u Republici Srbiji, tako i u kontekstu vremenskog okvira.

Tabela 2 - Deskriptivna statistika između zavisne i nezavisnih varijabli u modelu na tržištu nekretnina Republike Srbije za period: 2014: Q1 – 2023:Q4

Indikatori	HPI	GDP	CPI	BCIR	EXR	HS
Srednja vrednost	1,3777E2	2,245	112,210	6,431	1,1880E2	1,4467E0
Std. devijacija	35,184	3,392	14,235	2,704	2,180	1,13225582E0
Varijansa	1,238E3	11,506	202,65	7,313	4,755	1,282
Mera asimetrije	0,586	0,552	1,346	1,078	1,116	-0,740
Spljoštenost	-0,857	3,143	0,759	0,595	0,327	0,939
Min	94,91	-6,3	97,8	3,31	115,38	1,8027E0
Max	203,37	13,8	146,1	14,13	123,97	3,49667E0

Izvor: Kalkulacija autora na osnovu podataka Narodne banke Srbije, Republičkog zavoda za statistiku i podataka Svetske banke

Prethodna tabela ilustruje rezultate deskriptivne statistike između zavisne varijable, tj. indeksa cena nekretnina i nezavisnih varijabli: bruto domaćeg proizvoda, indeksa potrošačkih cena, kamatne stope na bankarske kredite, deviznog kursa dinara prema evru i štednje sektora stanovništva. U kontekstu kretanja prve mere rizika, odnosno standardne devijacije najjaču volatilnost su zabeležile sledeće varijable: stopa štednje sektora stanovništva, indeks cena nekretnina (35,18%) i indeks potrošačkih cena (14,23%). Takođe, i srednja vrednost je pratila paralelni trend, kao i standardna devijacija. I pored pojačane neizvesnosti na globalnom nivou, zatim tenzija izazvanim geopolitičkim faktorima i krizom u Ukrajini, ukupna štednja sektora stanovništva nastavila je trend rasta jačajući time depozitnu osnovu bankarskog sektora Republike Srbije, koja čini osnovni izvor finansiranja kreditne aktivnosti. Primera radi, devizna štednja na kraju 2022. godine dostigla je iznos od oko 12,8 mlrd evra, što je u apsolutnom iznosu više za oko 0,5 mlrd evra u odnosu na 2021. godinu. Isto tako, štednja sektora stanovništva u bankama u Republici Srbiji je u četvrtom kvartalu 2023. godine veća za oko 65% u odnosu na četvrti kvartal 2014. godine. Analiza isplativosti štednje koju sprovodi Narodna banka Srbije pokazuje da je u proteklih deset godina dinarska štednja bila isplativija od štednje u evrima, kako na kratki, tako i na dugi rok, zahvaljujući pre svega sledećim faktorima: zdrave i očuvane finansijske stabilnosti, relativno viših kamatnih stopa na štednju u dinarima nego na štednju u eurima, povoljnijeg poreskog tretmana štednje u domaćoj valuti, i drugih faktora (Narodna banka Srbije, 2022). Takođe, jedan od esencijalnih faktora rasta štednje sektora stanovništva u bankama u Republici Srbiji je i nepostojanje alternativnih i povoljnijih vidova štednje i investiranja. S tim u vezi, indeks cena nekretnina pokazao je veliku kolebljivost i oscilaciju, tako da je na kraju četvrtog kvartala 2014. godine sa 96,47 indeksnih poena povećan na 203,37 na kraju četvrtog kvartala 2023. godine, što je povećanje za oko 110,81%.

Tabela 3 -Korelaciona analiza (Pearson koeficijent korelacije) između zavisne varijable i nezavisnih varijabla na tržištu nekretnina Republike Srbije za period: 2014: Q1 – 2023:Q4

		HPI	GDP	CPI	BCIR	EXR	HS
HPI	Pearson Correlation	1,000	0,206	0,958	-0,432	-0,517	0,124
	Sig. (2-tailed)	-	0,202	0,000	0,004	0,001	0,447
	N	40	40	40	40	40	40
GDP	Pearson Correlation	0,206	1,000	0,107	-0,471	-0,084	-0,150
	Sig. (2-tailed)	0,202	-	0,511	0,002	0,605	0,357
	N	40	40	40	40	40	40
CPI	Pearson Correlation	0,958	0,107	1,000	-0,217	-0,466	0,036
	Sig. (2-tailed)	0,000	0,511	-	0,179	0,002	0,824
	N	40	40	40	40	40	40
BCIR	Pearson Correlation	-0,432	-0,471	-0,217	1,000	0,064	-0,214
	Sig. (2-tailed)	0,004	0,002	0,179	-	0,697	0,185
	N	40	40	40	40	40	40
EXR	Pearson Correlation	-0,517	-0,084	-0,466	0,064	1,000	-0,151
	Sig. (2-tailed)	0,001	0,605	0,002	0,697	-	0,351
	N	40	40	40	40	40	40
HS	Pearson Correlation	0,124	-0,150	0,036	-0,214	-0,151	1,000
	Sig. (2-tailed)	0,447	0,357	0,824	0,185	0,351	-
	N						

Izvor: Kalkulacija autora na osnovu podataka Narodne banke Srbije, Republičkog zavoda za statistiku i podataka Svetske banke

Rezultati istraživanja Kostasa i Haibina (2004) pokazuju da postoji pozitivan uticaj inflacije na cene stambenih nekretnina. Dati zaključak objašnjavaju troškovima gradnje stanova. U periodu kada nastupi inflacija, cene materijala za gradnju se povećavaju, što konsekvntno poskupljuje radove. U cilju ostvarivanja željenog profita izvođači radova ili investitori tada povećavaju prodajne cene. Efekat troškova gradnje može biti prikriven, s obzirom da izvođači radova mogu čekati povoljan trenutak, te ne prodavati novogradnju po njenom završetku, ukoliko potražnja u datom momentu nije zadovoljavajuća. S tim u vezi, delovanje inflacije na cene stambenih nekretnina može doći do izražaja u budućnosti. Iz tabele 3 se da primetiti da je najjača pozitivna korelacija sa zavisnom promenljivom, odnosno indeksom cena nekretnina ostvarila varijabla indeksa potrošačkih cena (0,958) pri signifikantnošću ($p < 0,05$). Prema Cohen-u (1988) ukoliko se korelacija kreće između 0,50 i 1,0 onda je reč o jakoj korelaciji.

Mnoga istraživanja pokazuju negativnu kauzalnost između kamatnih stopa i cena stambenih nekretnina. Trofimov (2018) ističe razloge jeftinog zaduživanja u kontekstu hipoteka manjih vrednosti, kao i jeftinih zajmova. Jeftini zajmovi utiču na to da domaćinstva povećavaju potražnju za nekretninama. Ravnotežu na tržište nekretnina donose investitori u stambene projekte, gde niske kamatne stope predstavljaju povoljno poslovno okruženje za izgradnju i finansiranje novih stambenih jedinica. U ovom istraživanju je dobijena negativna kauzalnost između kamatnih stopa na kredite i indeksa cena nekretnina (-0,432) pri značajnosti manjoj od 5%.

Jedna od bitnih pretpostavki primene metoda najmanjih kvadrata je da regresori nisu međusobno perfektno linearno zavisni, jer u slučaju da postoji perfektna korelacija među njima, ocene regresionih koeficijenata postaju nedeterminisane. Multikolinearnost prema tome, podrazumeva linearnu zavisnost među regresorima modela, i najbolje se objašnjava kao nedostatak nezavisnih varijacija u eksplanatornim varijablama da bi se sa preciznošću razdvojili njihovi zasebni uticaji na zavisnu varijablu (Jovičić i Mitrović-Dragutinović, 2018). Dakle, multikolinearnost postoji kada su nezavisne promenljive jako korelisane. U ovom istraživanju ćemo izračunati faktor porasta varijanse (engl. variance inflation factor – VIF), da bi testirali da li postoji ili ne postoji multikolinearnost između nezavisnih varijabli.

Svaka varijabla koja ima VIF koeficijent veći od 3 smatra se multikolinearnom i isključuje se iz modela. Takođe, u slučaju multikolinearnosti, koeficijenti varijabli su nestabilni i standardne greške su previsoke. Tabela u nastavku teksta prikazuje rezultate testiranja multikolinearnosti putem VIF koeficijenta.

Tabela 4 - Multikolinearna analiza preko faktora porasta varijanse za sve posmatrane nezavisne varijable

Variable	VIF	1/VIF
GDP	1,42	0,702497
CPI	1,35	0,739360
BCIR	1,51	0,661561
EXR	1,34	0,748452
HS	1,19	0,841246
Prosečna vrednost VIF	1,36	

Izvor: Kalkulacija autora

Kao što se može primetiti u prethodnoj tabeli, svaka pojedinačna nezavisna varijabla ima vrednost VIF koeficijenta manju od 3, što navodi na zaključak da ne postoji multikolinearnost između varijabli, pa postavljeni model vredi. U tabeli 3 je evidentno da nezavisne varijable između sebe imaju koeficijent korelacije ispod $r = 0,90$, što takođe navodi na zaključak da ne postoji multikolinearnost (Pallant, 2011).

Takođe, u ovom istraživanju ćemo pokazati da li su reziduali normalno distribuirani ili nisu putem Shapiro – Wilk W testa. Postaviće se dve hipoteze, i to:

Ho – Reziduali imaju normalnu distribuciju, i

H1 – Reziduali nemaju normalnu distribuciju.

Rezultati Shapiro- Wilk W testa su predstavljeni u sledećoj tabeli:

Tabela 5 - Rezultati Shapiro Wilk W testa za testiranje normalne distribucije reziduala

Varijabla	Obs	W	V	z	Prob>z
U	40	0,96975	1,196	0,376	0,35341

Izvor: Kalkulacija autora

Iz prethodne tabele, a prema rezultatima Shapiro Wilk testa se vidi da je verovatnoća veća od 5% što navodi na zaključak da se prihvata nulta hipoteza i da reziduali imaju normalnu distribuciju i odbacuje se alternativna hipoteza.

U statistici, niz slučajnih promenljivih je homoskedastičan ako sve njegove slučajne promenljive imaju istu konačnu varijansu, gde je ovo svojstvo poznato kao homogenost varijanse. Komplementarni pojam se naziva heteroskedastičnost poznat takođe kao heterogenost varijanse. Takođe, u ovom istraživanju ćemo ispitati homoskedastičnost i heteroskedastičnost reziduala uz pomoć Breusch – Paganovog testa, postavljanjem sledećih hipoteza:

H_0 – Reziduali su homoskedastični (imaju konstantnu varijansu), i

H_1 – Reziduali su heteroskedastični.

Rezultati Breusch – Pagan testa su predstavljeni u sledećoj tabeli:

Tabela 6 - Rezultati Breusch -Pagan testa za testiranje homoskedastičnosti i heteroskedastičnosti reziduala

chi 2(1)	0,86
Prob >chi2	0,3547

Izvor: Kalkulacija autora

Iz tabele 6, a prema rezultatima Breusch-Pagan testa se vidi da je verovatnoća veća od 5% i iznosi 35,47%, što navodi na zaključak da se prihvata nulta hipoteza i da reziduali imaju konstantnu varijansu, što je poželjno za model i odbacuje se alternativna hipoteza.

U tabeli 7 prikazani su rezultati regresije fiksnih efekata (FE) između odabranih varijabli u modelu. Ukupan broj opservacija je 40 što čini model relativno reprezentativnim. Empirijska vrednost F – testa za 8 stepeni slobode u numeraciji i 32 stepeni slobode u apoenu iznosila je 290,09. Nezavisne varijable koje su pokazale najznačajniju korelaciju sa zavisnom promenljivom, odnosno indeksom cena nekretnina u modelu, i čija je p – vrednost manja od 5% su sledeće: indeks potrošačkih cena (0,000), kamatna stopa na bankarske kredite (0,000) i devizni kurs dinara prema evru (0,003).

Tabela 7 - Regresioni model fiksnih efekata između zavisne (HPI) i nezavisnih varijabli na tržištu nekretnina Republike Srbije za period: 2014:Q1-2023:Q4

Nasumični efekti GLS regresije					Broj opservacija = 40	
R ² : unutar = 0,9791					Broj grupa = 4	
Između = 0,9454						
Ukupno: 0,9788					Opservacija po grupi min = 10	
Prosečno:10,0						
Maksimalno: 10						
F(8, 32) = 290,09						
Prob>F = 0,000						
HPI (zavisna)	Koef.	St. greška	t	P> t	[95% Interval poverenja]	
GDP	0,0035	0,3209	0,01	0,991	-0,6510	0,6581
CPI	2,1268	0,0746	28,48	0,000	1,9745	2,2791
BCIR	-3,0291	0,4151	-7,30	0,000	-3,8756	-2,1825

EXR	-1,5857	0,4851	-3,27	0,003	-2,5752	-0,5963
HS	0,8152	0,8807	0,93	0,362	-0,9810	2,6115
_cons	105,798	62,919	1,68	0,103	-22,525	234,123
Sigma_u	0,8695					
Sigma_e	5,6841					
Rho	0,02286					

Izvor: Proračun autora

Takođe, iz prethodne tabele se može primetiti da postoji inverzna veza između kamatne stope na bankarske kredite i indeksa cena nekretnina (-3.0291). Dakle, to znači da ako se BCIR smanji za 1% onda će HPI porasti za oko 3.029 pod pretpostavkom da se druge varijable smatraju nepromenjenim. Prema oceni banaka rast cena stambenih nepokretnosti i kamatnih stopa predstavljali su faktore smanjenja tražnje sektora stanovništva za kreditima na kraju 2022. godine. Standardi za odobravanje kredita na strani ponude pooštreni su od drugog tromesečja 2022. godine, na šta su najviše uticali povećani troškovi izvora finansiranja, manja konkurencija u bankarskom sektoru, te neizvesnost u kontekstu opšte ekonomske situacije, što se reflektovalo na smanjenu spremnost za preuzimanje rizika (Narodna banka Srbije, 2022). Isto tako negativna kauzalnost je zabeležena i između deviznog kursa dinara prema evru i indeksa cena nekretnina (-1.586). Prema Asalu (2018) devizni kurs je bitan indikator u određivanju cena stambenih nekretnina. Naime, slab devizni kurs u odnosu na strane zemlje može pozitivno uticati na cene nekretnina. Strani investitori ili sektor domaćinstva će imati veću želju za kupovinom domaće nekretnine u drugoj zemlji kada domaća valuta deprecira u odnosu na stranu valutu. U tom slučaju, domaće stambene nekretnine postaju jeftinije za strane investitore čija će povećana potražnja za nekretninama u inostranstvu povećati cene na tržištu nekretnina.

Vrednosti F statistike i Wald chi 2 testa su signifikantne na nivou značajnosti manjem od 5% za posmatrane skupove varijabli i podataka, što ukazuje na činjenicu da predloženi model dobro odgovara podacima. Isto tako rezultati analize pokazuju da oko 97.88% promena u indeksu cena nekretnina u Republici Srbiji je objašnjeno određenim nezavisnim varijablama koje se koriste u ovom modelu (Tabela 8).

Tabela 8 - Regresija slučajnih efekata (GLS) između zavisne (HPI) i nezavisnih varijabli na tržištu nekretnina Republike Srbije za period: 2014-2023. god.

Fiksni efekti unutar regresije					Broj opservacija = 40	
R ² : unutar = 0,9791					Broj grupa = 4	
Između = 0,9454						
Ukupno: 0,9788					Opservacija po grupi min = 10	
Prosečno:10,0						
Maksimalno: 10						
Wald chi 2 (5) =1.569,14						
Prob>F = 0,000						
HPI (zavisna)	Koef.	St. greška	t	P> t	[95% Interval poverenja]	
GDP	0,0075	0,3090	0,02	0,980	-0,5982	0,6134
CPI	2,1294	0,0717	29,66	0,000	1,9887	2,2701

BCIR	-3,0213	0,3995	-7,56	0,000	-3,8043	-2,2383
EXR	-1,5495	0,4658	-3,33	0,001	-2,4625	-0,6365
HS	0,8842	0,8461	1,04	0,296	-0,7742	2,5426
_cons	101,037	60,393	1,67	0,094	-17,330	219,40
Sigma_u	0					
Sigma_e	5,684					
Rho	0					

Izvor: Proračun autora

Na osnovu rezultata GLS regresionog modela na zavisnu varijablu, odnosno indeks cena nekretnina (HPI) najjači pozitivan uticaj imala je CPI nezavisna varijabla, što je naznačeno vrednošću koeficijenta od 2,1294 i vrednošću verovatnoće od 0,000. Dakle, to znači da ako se CPI poveća za 1% onda će HPI porasti za 2,1294 pod pretpostavkom da se druge varijable smatraju nepromenjenim. Rezultati ovog istraživanja su podržani studijama koje su sprovedli Zamillaili i Qoyum (2021), Panagiotidis i Printzis (2016), Fanama i Pratikto (2019), Fauzia (2019) i Mohan i ostali (2019) koji pokazuju da inflacija značajno pozitivno utiče na cene nekretnina. Teorijski, odnos između CPI i indeksa cena nekretnina objašnjava da povećanje CPI može izazvati povećanje cena građevinskog materijala, troškova rada i drugih operativnih troškova koji se odnose na izgradnju i održavanje nekretnina. Konsekventno, ovo može dovesti do rasta cena nekretnina.

S druge strane, iz tabele 8 se može primetiti da je najjača negativna veza zabeležena između kamatne stope na bankarske kredite i indeksa cena nekretnina (-3,0213) pri signifikantnošću manjom od 5%, što se može zaključiti da sa smanjivanjem kamatnih stopa na kredite raste potražnja za kreditima, kao i potražnja za nekretninama. Balqis i Purwono (2021) napominju da se kamatne stope uvek pomno prate, kako ne bi imale veliki uticaj kada rastu jer će usporiti realni sektor. Međutim treba napomenuti da se kamatne stope razlikuju od banke do banke uprkos pragu koji je postavila Narodna banka. To znači da će niža kamatna stopa povećati kupovnu moć pojedinca pri kupovini stana jer je kamata koja se plaća niža. S tim u vezi, to će delovati da se poveća potražnja za stambenim kreditima, kao i cena stanova. Tokom poslednjih godina povećan je promet na tržištu nekretnina, kako u Republici Srbiji, tako i u drugim zemljama okruženja. Dakle, poslednjih godina cene na tržištu nekretnina rasle su skoro kao na svetskom nivou, na čiji rast je uticalo mnoštvo faktora kao što su: povoljna kretanja na tržištu rada, niske kamatne stope, potraga za alternativnim investicijama, povećani rad od kuće usled pandemije COVID-19 i drugi faktori (Narodna banka Srbije, 2022).

Takođe, devizni kurs dinara prema evru je nezavisna varijabla koja ima značajan negativan uticaj na indeks cena nekretnina o čemu svedoči vrednost verovatnoće od 0,001, što je manje od 5% i vrednost koeficijenta od -1,5495. To znači da ako se devizni kurs dinara prema evru poveća za 1% indeks cena nekretnina će se konsekventno smanjiti za oko -1,5495 pod pretpostavkom da se ostale varijable smatraju nepromenjenim. Tokom 2022. godine dinar je ojačao prema evru za oko 0,2%. U istom periodu usled slabljenja evra prema dinaru na međunarodnom finansijskom tržištu dinar je oslabio prema dolaru za oko 5,7% (Narodna banka Srbije, 2022). Teorijski, ako se kurs domaće valute smanji, cene imovine domaćeg tržišta nekretnina, kao što su stambeni objekti, postaće jeftinije za strane investitore, te uslovi poput ovog mogu povećati priliv kapitala u sektor nekretnina i podići cene stambenih objekata. Osim toga, devizni kurs može uticati i na cenu proizvodnje građevinskog materijala jer sa povećanjem kursa domaće valute može doći do povećanja cena uvezenog građevinskog materijala, te će na kraju rasti i cene nekretnina. Magdalena (2015) navodi da je kurs važan u kupovini nekretnina jer kada valuta oslabi iznos glavnog duga plus kamate postaju sve viši za plaćanje. Tako da se cena kapitala povećava zbog kursa i u krajnjoj instanci povećava se cena nekretnine. Prema Sumer i Ozorhanu (2020) devizni kursevi mogu uticati na percepciju investitora o razmatranju stanovanja kao investicione opcije. Dakle, kada domaći kurs oslabi, više se mora trošiti na posedovanje imovine i dugoročno je radije kombinovati razne druge investicione instrumente.

Tabela 9 - Rezultati Hausman-ovog testa između nezavisnih varijabli za period: 2014.-2023. god.

Varijable	(b) Model fiksnih efekata	(B) Model slučajnih efekata	(b-B) Razlika	Sqrt (diag(V_b-V_B)) S.E.
GDP	0,0035446	0,0075657	-0,0040211	0,0864171
CPI	2,12682	2,129453	-0,002633	0,0205701
BCIR	-3,029115	-3,021348	-0,0077671	0,1126068
EXR	-1,585774	-1,54952	-0,0362541	0,1355381
HS	0,8152433	0,8842281	-0,0689848	0,2444094

Izvor: Proračun autora

$$\begin{aligned} \text{chi2}(5) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 0,12 \\ \text{Prob}>\text{chi2} &= 0,9998 \end{aligned}$$

S obzirom da je chi kvadratna vrednost jednaka nuli, kao i to da je p – vrednost pojedinih nezavisnih varijabli jednaka nuli ili nešto veća od nule, ali manja od 5% (za varijable kao što su: indeks potrošačkih cena, kamatne stope na bankarske kredite i devizni kurs domaće valute u odnosu na evro) onda se može zaključiti da su pojedine nezavisne varijable imale uticaj na zavisnu varijablu. Takođe, prema rezultatima Hausman testa verovatnoća je veća od 5% i iznosi 0,9998 što navodi na zaključak da se prihvata nulta hipoteza, odnosno GLS regresija slučajnih efekata i odbacuje alternativna hipoteza, tj. model fiksnih efekata.

Zaključna razmatranja

Tržište stambenih nekretnina je od vitalne važnosti za stanovnike bilo koje zemlje, kao i za Vladu i pripadajuća državna upravljačka tela. Nekretnine kao oblik imovine imaju mnogo karakteristika koje ih razlikuju od drugih oblika imovine na tržištima. Ponuda nekretnina je lokalna, gde da bi se nekretnina uopšte ponudila na tržište treba znatno više vremena nego kod drugih proizvoda, s obzirom na vremenski rok faze planiranja i izgradnje nekretnina. Recimo, cene najma mogu ostati na istom nivou duži vremenski period nezavisno od situacije na tržištu iz razloga dugoročnog ugovora o najmu. Određena ograničenja tržišta stambenih nekretnina odnose se na transparentnost, gde se većina transakcija vrši bilateralnim pregovorima. Takođe, likvidnost ovog tržišta je ograničena zbog visokih transakcionih troškova, gde se kupci uglavnom oslanjaju na kredite banaka. S tim u vezi, navedene karakteristike uzrokuju kretanje cena stambenih nekretnina po drugačijim obrascima od drugih oblika imovine.

U toku proteklih nekoliko godina povećan je promet na tržištu nekretnina, kako u Republici Srbiji, tako i u drugim zemljama regiona. Dakle, cene nekretnina su rasle skoro na svetskom nivou, na šta su uticali brojni faktori poput povoljnijih kretanja na tržištu rada, niskih kamatnih stopa, potraga za alternativnim vidovima investicija i drugi faktori.

Rad obuhvata teorijski i empirijski deo istraživanja koji se sproveden uz pomoć korelacione i regresione analize. Osnovni cilj ovog rada je bio da se istraži uticaj određenih makroekonomskih i bankarskih indikatora na cene nekretnina u Republici Srbiji za period od prvog kvartala 2014., do četvrtog kvartala 2023. godine.

Dakle, u ovom istraživanju su korišćeni efekti nezavisnih varijabli i njihov uticaj na zavisnu varijablu korišćenjem objedinjenog OLS regresionog modela (FE) i regresionog modela slučajnih efekata (GLS) uz pomoć Hausmanovog testa. Primena modela višestruke linearne regresije ukazuje na to da je indeks cena nekretnina u poslednjih 10 godina u pozitivnoj korelaciji i sa visokom značajnošću sa indeksom potrošačkih cena, a u negativnoj korelaciji sa kamatnom stopom na bankarske kredite i deviznim kursom dinara prema evru. Za razliku od prethodnih rezultata istraživanja, rast bruto domaćeg proizvoda, kao i rast štednje sektora stanovništva ne izgledaju statistički značajni. Stoga se predlaže Vladi da održava stabilnost indeksa potrošačkih cena kako bi se održala stabilnost cena nekretnina. U kontekstu testiranja postavljenih hipoteza rezultati istraživanja putem Hausmanovog testa su pokazali da je verovatnoća veća od 5%, što upućuje na zaključak da se prihvata nulta hipoteza, odnosno GLS regresija slučajnih efekata i odbacuje alternativna hipoteza, odnosno model fiksnih efekata. Pitanje o važnosti tržišta nekretnina ponovo je aktuelno iz razloga opravdane percepcije mladih ljudi i domaćinstava gde je skoro pa nemoguće kupiti vlastitu nekretninu.

Ograničena relevantna literatura na ovu temu takođe ograničava razvoj daljih istraživanja faktora koji utiču na cene nekretnina. S tim u vezi, potrebna su dalja istraživanja koja bi uključivala duži vremenski period i veći broj zemalja, kako bi se dopunilo i razvilo razumevanje determinanti cena nekretnina. Isto tako nova istraživanja autora u datoj problematici mogu se proširiti uključivanjem većeg broja nezavisnih varijabli. Ovo istraživanje takođe može biti od pomoći da se procene buduće promene indeksa cena nekretnina, koje su pre svega uslovljene promenama posmatranih makroekonomskih i bankarskih varijabli.

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DETERMINANTS OF THE REAL ESTATE MARKET IN THE REPUBLIC OF SERBIA: OVERVIEW AND FINDINGS

Prof. Almir Alihodžić. PhD

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

Summary: *Value changes in the real estate market affect both the quality of bank loan portfolios and financial stability and the real economy. The Republic of Serbia is one of the countries facing an upward trend in demand for housing. This paper investigates the impact of macroeconomic and banking variables on the real estate price index in Serbia for the period from 2014 to 2023 on a quarterly basis. Also, panel regression and correlation analysis are applied in this research. The selected independent (explanatory) variables are the gross domestic product, the consumer price index, the interest rate on bank loans, the exchange rate of the domestic currency against the euro and household saving. The research results showed that the independent variable consumer price index had the most significant impact on the housing price index. On the other hand, the following independent variables had the most significant negative impact on the dependent variable (housing price index): interest rate on bank loans and the domestic currency against the euro.*

Keywords: Real estate price index, macroeconomic variables, banking variables, Shapiro Wilk test, Breusch-Pagan test, regression analysis, Hausman test.

JEL classification: R30, E31, G51

Introductory Considerations

Accommodation and housing are considered basic human needs. To achieve this, it is the civic duty of every community to help people manage adequate housing. In this way, the Government is trying to provide a consumer-friendly approach to succeed in implementing its decisions on the housing market. For the economy to develop in the right direction, it is important to establish a balance between housing demand and availability (Rozin, 2020).

Therefore, housing is the main component of household wealth and one of the main drivers of private consumption (Mian et al., 2013). Furthermore, housing markets are highly relevant to financial stability, as housing price bubbles have historically been dramatically damaging events. In this regard, the assessment of trends and risks in housing markets is crucial for central banks (Jorda et al., 2015). Choosing the right mix of policies depends on the availability of detailed and timely information on housing supply and demand. For example, policymakers may want to choose different policies depending on whether excessive house price growth is due to a demand-side boom or a low supply.

The development of the housing market is determined by many closely related economic, legal, financial, institutional, and political factors. They can be quantified primarily in international terms, where macroeconomic factors such as gross domestic product (GDP), inflation, rates of return, and the availability of mortgage loans play a significant role. Several factors affect demand, generally regardless of local variations. These can be various causes and administrative-political, legal, and economic mechanisms, such as the housing policy of state authorities, the existing system of loans and the possibilities of obtaining them, the inflation rate, and others (Hott et al., 2008).

Housing prices are correlated with business cycle movements and a wide range of real variables, such as investment and consumption. In connection with these attributes, the real estate sector in many countries has become one of the key sectors of economic growth and development. In the last decade, especially in most industrialized countries, housing prices have risen dramatically due to low long-term interest rates, economic growth, and high liquidity (Ahearne et al., 2005).

The vital issues of housing and economic development have received much attention in the last two decades. The global financial crisis of 2008 showed a significant connection between housing and the economy. It was also probably one of the worst financial crises in the US that formed a super housing bubble in the global real estate market.

After the collapse of the US real estate market or the subprime market crisis of 2008-2009, there was a resurgence of focus on the real estate market. The real estate market has a dual role as a consumer good and as an investment, which is recognized in the literature (Leung, 2004). The COVID-19 pandemic has further changed and created certain real estate price trends of its own.

In recent years, the turnover in the real estate market has increased in the Republic of Serbia, which was in line with trends in this segment of the market, as well as in other countries. Therefore, turnover was higher in 2022 by 22% compared to 2021. The given market trends were influenced by several factors such as increased demand for real estate, which was primarily a reflection of positive trends in the labor market, favorable credit conditions, low-interest rates, the search for alternative investments, increased work from home due to the pandemic and other factors (National Bank of Serbia, 2022).

The main goal of this research is to determine to what extent and with what intensity the selected macroeconomic and banking variables influence the movement of the housing price index in the Republic of Serbia. The null hypothesis supports the random effects model. On the other hand, the alternative hypothesis supports the fixed effects model. The paper will test the following hypotheses:

H0: Null hypothesis: The random effects model is appropriate.

H1: Alternative hypothesis: The fixed effects model is appropriate.

The hypotheses in this research will be tested using the Hausman test.

The paper is structured in six parts. The first part refers to the introductory considerations with emphasis on the importance of the real estate market, the research objective, and the set hypotheses. The second part describes an overview of previous research in terms of the influence of various demographic, social, macroeconomic, and banking indicators on the movement of the real estate price index and other relevant indicators on the real estate market. The third part briefly analyzes the state of the real estate market in Serbia through the prism of selected indicators on the real estate market. The fourth part describes the chosen research methodology with a focus on the fixed effects model and the random effects model. The fifth part refers to the data needed for the analysis. The sixth part presents the obtained research results, as well as certain observations and recommendations.

Review of Relevant Literature

The variety of prices and activities of the housing market at the regional level stems primarily from the variety of socio-economic factors and social processes. Special attention in many papers is devoted to demographic factors that include age, gender, marital status, and which affect housing needs. The demographic situation can change as a result of migration between countries, regions, and individual cities (Annas et al., 1984).

Many authors have studied the relationship between demographics and the real estate market. An increase in the number of babies has little short-term effect on the housing market but increases the demand for new houses twenty years later. A decrease in the number of births or an increase in the average age of the population strongly affects the demand and the prices of apartments (Mankiw & Weil, 1989).

A significant share of housing expenditures in household budgets results in a close correlation between income growth in a given area and housing price growth (Reichert, 1990). The results of empirical research according to Galin (2006) indicate that due to the low flexibility of the income of the housing market, the given relationship can be debatable in many cases.

Incomes of the population are closely related to the labor market, and in addition to income and employment opportunities, they are an important potential of the region, which increases local housing prices. Also, there are expectations that the increase in the percentage of unemployed in this area will affect the decrease in the price of apartments (Berg, 2002).

Economic factors include not only the income of the population and the labor market, but also the state of the local economy. This can be reflected in an indicator such as the local GDP, although empirical research conducted on the Canadian market shows that relationships that are quite logical and obvious are not always confirmed in practice. Equally important are the indicators that derive directly from the real estate market, and refer to the balance or imbalance between supply and demand (Allen et al, 2009).

The level of development of the housing market reflects the economic condition of households, which depends primarily on the stability of income. Therefore, the effective demand, and as a result the price of apartments, is largely influenced by the financial resources of households such as savings and disposable income (Lin et al, 2014).

Macroeconomic factors are of capital importance in understanding price movements in the real estate market. According to Irandoust (2019), the prices of residential real estate are determined by the law of supply and demand, which further means that every factor that affects the said law also has an impact on the price determination of the place of residence. In this regard, macroeconomic factors can have a decisive influence in terms of determining the overvaluation or undervaluation of the value of residential real estate.

Kau and Keenan (1980) conducted a related study on the relationship between interest rates and housing prices. They concluded that increased interest rates mainly affect the decrease in demand in the real estate market and consequently decrease the price of apartments. Contrary to Cow and Keenan, Geoffrey (2002) and Ahearne et al. (2005) believe that as interest rates rise, the costs of investing in real estate development will increase and profits will decrease, which would indirectly lead to a decrease in the supply of real estate, and ultimately to an increase in real estate prices.

Also, Pillaiyan (2015) found an inverse relationship between interest rate and housing prices in Malaysia and argued that low interest rates fueled the property price bubble. Likewise, she stated that any increase in interest rates in the short term leads to a corresponding change in the price of apartments.

Lin et al. (2014) used twenty local indicators, including population age, marriage rate, education, unemployment, safety, air quality, etc. The research results showed that the market value measured by the number of transactions proved to be a disincentive measure of the average price of apartments.

Belke and Keil (2018) summarize four approaches to the variables that affect residential real estate prices. Namely, first, the asset pricing approach that links real estate prices to future discounted income. Second, it focuses on the affordability and sustainability of the prices of apartments or other private households. This is analyzed through the income ratio, then the loan-to-value index ratio, then the actual monthly mortgage cost-to-income ratio. Third, there is the hedonic pricing method. This means that hedonic pricing modeling takes into account the specific characteristics of individual buildings or neighborhoods, each of which contributes to the overall value of the property. Fourth, some econometric models directly estimate the effect of real estate prices. Such models are based on some form of national, regional, or local house price index combined in time series or panel form.

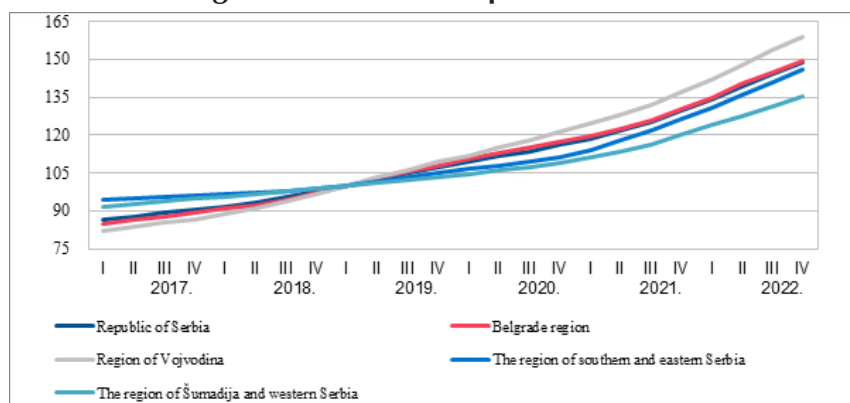
In his research, Trofimov (2018) shows that with long-term high economic growth, residential construction can become excessively stimulating, where there is excessive construction, which consequently creates a supply of residential real estate greater than the demand. This results in a drop in real estate prices.

Tripathi (2019) in his extensive cross-country research uses a random effect model and suggests that the government should adjust monetary policies such as inflation and money supply to curb real estate prices. Also, Khoo et al. (2019) studied real estate prices in Malaysia, and in the same way, recommended that the Government should strengthen the promotion of housing prices to avoid accelerated inflation. Price stability helps to maintain financial and economic activity at a satisfactory level. Therefore, the policy of price stability is a valuable tool for lowering and stabilizing inflation.

Analysis of Selected Indicators on the Real Estate Market of the Republic of Serbia

The apartment price index was developed by international guidelines as well as based on a model for the mass assessment of apartments, which, in addition to prices from sales contracts, also takes into account various qualitative characteristics of real estate from relevant sources. The movement of the index value provides insight into the continuous trend of rising apartment prices during the observed period (National Bank of Serbia, 2022). The graph below illustrates the trend of the housing price index on the real estate market in the Republic of Serbia for the period: 2017 - 2022.

Graph 1 - Trend of the Housing Price Index in the Republic of Serbia for the Period: 2017 – 2022

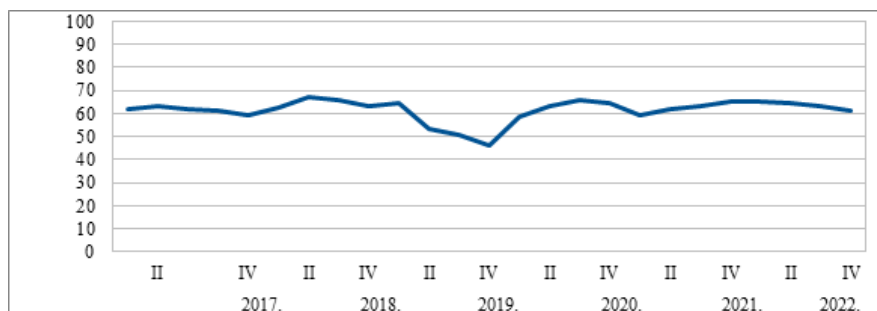


Source: www.nbs.rs (Accessed on: January 16, 2024)

The price index of apartments on the real estate market in the Republic of Serbia at the end of the fourth quarter of 2022 was 148.79, which is about 64% higher than in the fourth quarter of 2017. From the point of view of the region, the prices of apartments increased the most in the region of Vojvodina by about 16.02% and in the city of Belgrade by about 14.91%. As the largest number of assessed residential properties refers to the Belgrade region, it can be concluded that the average estimated value per square meter of residential properties in the Republic of Serbia is to the greatest extent determined by the movement of the assessed value of residential properties in the Belgrade region (National Bank of Serbia, 2022).

Loan-to-value is an indicator of the relationship between the value of the mortgage loan and the value of the real estate used to secure the given loan.

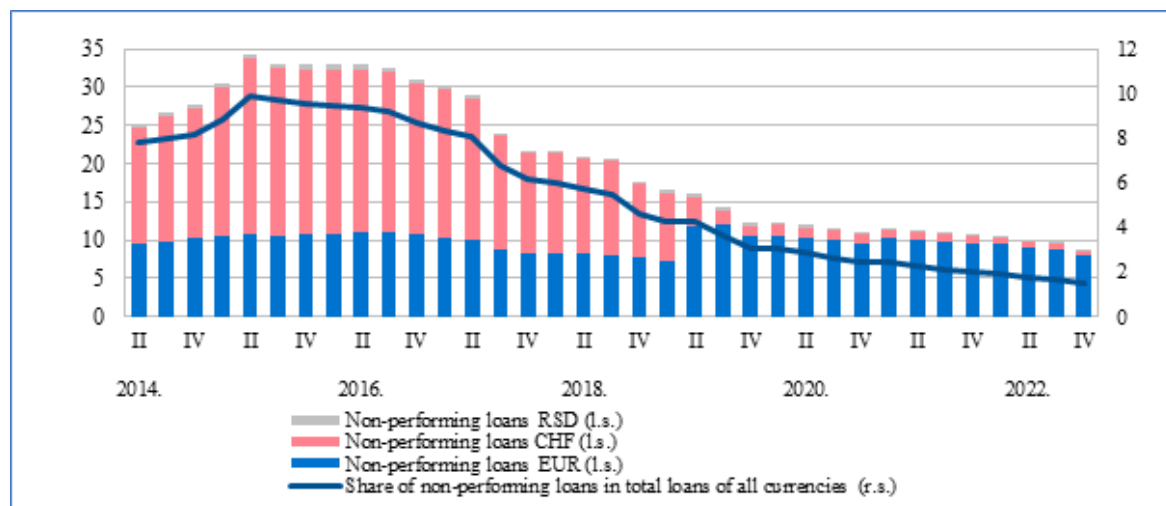
Graph 2 - The Value of Housing Loans for which the Apartment is Mortgaged in Relation to the Estimated Value of the Apartments - LTV Ratio for the Period: 2017 – 2022



Source: www.nbs.rs (Accessed on: January 16, 2024)

From the previous graph, it should be noted that the value of the LTV ratio in the last quarter of 2022 was 61.1%, which represents a relative increase compared to the fourth quarter of 2017 by about 2.55%. The average value of the LTV ratio is well below the prescribed level of 80%. To ensure the conditions for a better assessment of the value of real estate, which consequently affects the reduction of the risk of new non-performing loans, and the development of the market of non-performing loans, the National Bank of Serbia has been maintaining a database of real estate valuations that are the subject of mortgages and loans secured by mortgages since 2015 (National Bank of Serbia, 2022).

Graph 3 - Non-Performing Residential Construction Loans on the Real Estate Market of the Republic of Serbia for the Period: 2014 - 2022



Source: www.nbs.rs (Accessed on: January 16, 2024)

Real estate is very common in the banking sector of the Republic of Serbia as a loan collateral. In this regard, an adequate assessment of the value of real estate is of essential importance because banks are directly exposed to the risk of changes in the market prices of real estate. The previous graph shows a significant decrease in non-performing loans in 2022, which amounted to about 3.3% compared to 2014, where the share was over 20%. The reasons for the different time periods of the analysis of the selected indicators on the real estate market of the Republic of Serbia and the econometric analysis are primarily the lack of domestic statistics of the observed data.

Research Methodology

Econometric modeling of real estate prices using socioeconomic and environmental factors has a relatively long tradition and is often described in literature. An extensive review of statistical models describing the relationships between housing prices and the factors affecting them at the national, regional, and local levels was presented by Gasparenie et al. (2014) where they listed the advantages and disadvantages of the models as well as their structural elements. A question is often asked: why use panel regression analysis and data in different studies? The advantages of using panel analysis and data are numerous. Hsiao (1985), Clevermarket (1989), and Solon (1989) have listed several advantages of using panel data. Furthermore, panel data provide more informative data, greater variability, less collinearity among variables, and more degrees of freedom, and thus greater efficiency.

There are three types of panel analytical models used, namely: (1) pooled regression model, (2) fixed effect model, and (3) random effect model. A pooled regression model is one type of model that has constant coefficients related to both intercepts and slopes. For this model, researchers can pool all the data and run an ordinary least squares regression model. The fixed effect model is the differences between the cross-sectional units that can be captured by the differences in the constant term, and the intercept term of the regression model varies across the cross-sectional units. In a random effect model, the individual effects are randomly distributed across the cross-sectional units and to capture the individual effects, a regression model is specified with the intercept term representing the overall constant term (Seddigi and Lawler, 2000).

The main goal of this research is to measure key macroeconomic and banking indicators of real estate price changes. Estimates of potential determinants refer to existing literature. The econometric model is presented as follows:

$$\% \Delta HPI = \beta_0 + \beta_1 * (\% \Delta GDP) + \beta_2 * (\% \Delta CPI) + \beta_3 * (\% \Delta BCIR) + \beta_4 * (\% \Delta EXR) + \beta_5 * (\% \Delta HS) \quad (1)$$

An econometric model is a multiple regression model, including two or more explanatory variables. To account for the difference between the observed data and the expected value, a random error term is added $\varepsilon_i = \% \Delta$ the price of real estate - E (% Δ the price of real estate), where the equation of the new econometric model can be written as follows:

$$\% \Delta HPI = \beta_0 + \beta_1 * (\% \Delta GDP) + \beta_2 * (\% \Delta CPI) + \beta_3 * (\% \Delta BCIR) + \beta_4 * (\% \Delta EXR) + \beta_5 * (\% \Delta HS) + \varepsilon_i \quad (2)$$

The basic assumption is that the observed values of the econometric model satisfy the population ratio and adhere to the strict rules of exogeneity, conditionally uncorrelated errors, and normality of errors. In addition, it is important to note that there is no absolutely correct linear relationship between the explanatory variables. If the p-value is statistically significant, the fixed effect model should be used. On the other hand, if the p-value is not statistically significant, the random effect model should be used. The significance test was performed for all variables using the t-test at a significance level of 95% (Chmelarova, 2007).

Data

This research focuses on the following variables: the dependent variable will be the housing price index in the Republic of Serbia (HPI), while the gross domestic product (GDP), the consumer price index (CPI), the interest rate on bank loans (BCIR), the exchange rate dinars to the euro (EXR) and savings of the household sector (HS) considered as independent variables. The choice of observed variables for the analysis is the significant price growth and attractiveness of the real estate sector in the Republic of Serbia, as well as the assumed causality of independent variables as significant predictors. The research covers the period from the first quarter of 2014 to the fourth quarter of 2023. The analysis will be based on quarterly data because annual data is an unreliable sample for econometric evaluation. The data were collected from the official websites of the National Bank of Serbia, the Republic Institute for Statistics of Serbia, and the World Bank. The measurement and expected effect of the dependent and independent variables are given in Table 1.

Table 1 - Brief description of dependent and independent variables in the model

Variable	Abbreviation	Expected effect
Housing price index	HPI	
Gross domestic product	GDP	(+)
Consumer price index	CPI	(+)
Interest rate on bank loans	BCIR	(-)
Exchange rate of dinars against the euro	EXR	(-)
Household saving	HS	(+)

Source: Calculation by the author

Housing price index (HPI) - measures changes in residential real estate prices as a percentage change since some specified starting date that has an HPI of 100. Therefore, the real estate price index is an index number for measuring the level of price movements of residential property (apartments, private houses, terraced houses, etc.) that households periodically buy.

Gross domestic product (GDP) - is the total monetary or market value of all finished goods or services produced within the country's borders in a given period. As a broad measure of total domestic production, it functions as a comprehensive indicator of the economic health of the country under review (<https://www.investopedia.com>). GDP plays a significant role in the formation of residential real estate prices. According to Razali and Tan (2016), preferred economic growth raises residential real estate prices.

Consumer price index (CPI) - is the price index, that is, the price of the average weighted market basket of consumer goods and services purchased by households. Changes in the measured CPI follow price changes over time. Therefore, the consumer price index is the most frequently discussed measure of inflation. In general, an increase in the CPI can cause an increase in the prices of construction materials, labor costs, and other operating costs related to the construction and maintenance of housing. In this research, a positive correlation is assumed between the housing price index and the consumer price index.

The interest rate on bank loans (BCIR) - interest is a monetary fee for the use of borrowed money. Therefore, interest is the amount of money that a lender or financial institution receives for lending money. When interest rates rise, borrowing costs rise in parallel, and potential buyers are discouraged. As a result, demand for residential real estate is falling. According to Andrews (2010), there is a negative correlation between real estate prices and interest rates, which also depends on the degree of competition in the banking sector. In this paper, a negative correlation is assumed between the housing price index and interest rates on bank loans.

Exchange rate of dinars against the euro (EXR) - the exchange rate is the rate at which one currency will be exchanged for another currency and affects trade and the movement of money between countries. Exchange rates are affected by both the value of the domestic currency and the value of the foreign currency. Exchange rates can affect international flows of capital entering the real estate market. If the exchange rate of the domestic currency falls, the prices of domestic real estate assets such as housing will become cheaper for foreign investors, and conditions like this can increase capital inflows into the real estate sector and raise real estate prices. The study assumes a negative correlation between the housing price index and the exchange rate of the dinar against the euro.

Household saving (HS) - deposits are the main source of banking potential. Deposit sources make up over three-quarters of the total sources of bank funds (Plakalović & Alihodžić, 2015). The total savings of the household sector in banks in the Republic of Serbia continued its growth trend, strengthening the deposit base of the banking sector (National Bank of Serbia, 2022).

Results and Discussion

The results of descriptive statistics, correlation, multicollinearity, normal distribution, homoscedasticity, and heteroscedasticity as well as regression are presented in Tables 2-9. The total number of observations is 40, which represents a relatively representative sample both from the point of view of available data on the real estate market in the Republic of Serbia and in terms of the time frame.

Table 2 - Descriptive Statistics Between Dependent and Independent Variables in the Model on the Real Estate Market of the Republic of Serbia for the Period: 2014: Q1 – 2023: Q4

Indicators	HPI	GDP	CPI	BCIR	EXR	HS
Mean	1.3777E2	2.245	112.210	6.431	1.1880E2	1.4467E0
Std. Deviation	35.184	3.392	14.235	2.704	2.180	1.13225582E0
Variance	1.238E3	11.506	202.65	7.313	4.755	1.282
Skewness	0.586	0.552	1.346	1.078	1.116	-0.740
Kurtosis	-0.857	3.143	0.759	0.595	0.327	0.939
Min	94.91	-6.3	97.8	3.31	115.38	1.8027E0
Max	203.37	13.8	146.1	14.13	123.97	3.49667E0

Source: Calculation by the author based on data from the National Bank of Serbia, the Republic Institute of Statistics and data from the World Bank

The previous table illustrates the results of descriptive statistics between the dependent variable, i.e., the housing price index, and independent variables: gross domestic product, consumer price index, interest rates on bank loans, dinar exchange rate against the euro, and savings of the household sector. In terms of the movement of the first measure of risk, i.e. the standard deviation, the following variables recorded the strongest volatility: the savings rate of the household sector, the housing price index (35.18%), and the consumer price index (14.23%). Also, the mean followed a parallel trend as the standard deviation. Despite increased uncertainty at the global level, then tensions caused by geopolitical factors and the crisis in Ukraine, the total savings of the household sector continued the growth trend, thereby strengthening the deposit base of the banking sector of the Republic of Serbia, which constitutes the main source of financing credit activity. For example, foreign currency savings at the end of 2022 reached the amount of about 12.8 billion euros, which in absolute terms is more than 0.5 billion euros compared to 2021. Likewise, the savings of the household sector in banks in the Republic of Serbia in the fourth quarter of 2023 is about 65% higher than in the fourth quarter of 2014.

The analysis of the profitability of savings carried out by the National Bank of Serbia shows that over the past ten years, dinar savings have been more profitable than savings in euros both in the short and long term, thanks primarily to the following factors: healthy and preserved financial stability, relatively higher interest rates on savings in dinars than on savings in euros, more favorable tax treatment of savings in domestic currency, and other factors (National Bank of Serbia, 2022). Also, one of the essential factors in the growth of savings of the household sector in banks in the Republic of Serbia is the absence of alternative and more favorable forms of savings and investments. In this regard, the housing price index showed great volatility and oscillation, so that at the end of the fourth quarter of 2014, it increased from 96.47 index points to 203.37 at the end of the fourth quarter of 2023, which is an increase of about 110.81%.

Table 3 - Correlation Analysis (Pearson Coefficient of Correlation) Between the Dependent Variable and Independent Variables on the Real Estate Market of the Republic of Serbia for the Period: 2014:Q1 – 2023: Q4

		HPI	GDP	CPI	BCIR	EXR	HS
HPI	Pearson Correlation	1.000	0.206	0.958	-0.432	-0.517	0.124
	Sig. (2-tailed)	-	0.202	0.000	0.004	0.001	0.447
	N	40	40	40	40	40	40
GDP	Pearson Correlation	0.206	1.000	0.107	-0.471	-0.084	-0.150
	Sig. (2-tailed)	0.202	-	0.511	0.002	0.605	0.357
	N	40	40	40	40	40	40
CPI	Pearson Correlation	0.958	0.107	1.000	-0.217	-0.466	0.036
	Sig. (2-tailed)	0.000	0.511	-	0.179	0.002	0.824
	N	40	40	40	40	40	40
BCIR	Pearson Correlation	-0.432	-0.471	-0.217	1.000	0.064	-0.214
	Sig. (2-tailed)	0.004	0.002	0.179	-	0.697	0.185
	N	40	40	40	40	40	40
EXR	Pearson Correlation	-0.517	-0.084	-0.466	0.064	1.000	-0.151
	Sig. (2-tailed)	0.001	0.605	0.002	0.697	-	0.351
	N	40	40	40	40	40	40
HS	Pearson Correlation	0.124	-0.150	0.036	-0.214	-0.151	1.000
	Sig. (2-tailed)	0.447	0.357	0.824	0.185	0.351	-
	N						

Source: Calculation by the author based on data from the National Bank of Serbia, the Republic Institute of Statistics and data from the World Bank

The results of the research by Kostas and Haibin (2004) show that there is a positive impact of inflation on residential real estate prices. The given conclusion is explained by the costs of building apartments. In the period when inflation occurs, the prices of construction materials increase, which consequently makes the work more expensive. To achieve the desired profit, contractors or investors then increase the selling prices. The effect of construction costs can be hidden, given that contractors can wait for a favorable moment and not sell a new building after its completion if the demand at that moment is not satisfactory. In this regard, the effect of inflation on the prices of residential real estate may come to the fore in the future. From Table 3, it should be noted that the strongest positive correlation with the dependent variable, i.e., the housing price index, was achieved by the consumer price index (0.958) at significance ($p < 0.05$). According to Cohen (1988), if the correlation is between 0.50 and 1.0, then it is a strong correlation.

Many studies show negative causality between interest rates and housing prices. Trofimov (2018) highlights the reasons for cheap borrowing in terms of mortgages of lower value as well as cheap loans. Cheap loans influence households to increase demand for real estate. Investors in housing projects bring balance to the real estate market, where low-interest rates represent a favorable business environment for the construction and financing of new housing units. In this research, a negative causality was obtained between interest rates on loans and the housing price index (-0.432) at a significance of less than 5%.

One of the important assumptions of applying the least squares method is that the regressors are not perfectly linearly dependent on each other, because if there is a perfect correlation between them, the estimates of the regression coefficients become indeterminate. Multicollinearity, therefore, implies linear dependence among the model's regressors and is best explained as the lack of independent variation in the explanatory variables to accurately separate their separate effects on the dependent variable (Jovičić & Mitrović-Dragutinović, 2018). Therefore, multicollinearity exists when the independent variables are highly correlated. In our research, we will calculate the variance inflation factor (VIF) to test whether or not there is multicollinearity between the independent variables. Every variable that has a VIF coefficient greater than 3 is considered multicollinear and is excluded from the model. Also, in the case of multicollinearity, the variable coefficients are unstable, and the standard errors are too high. The table below shows the results of multicollinearity testing using the VIF coefficient.

Table 4 - Multicollinear analysis over the variance inflation factor for all observed independent variables

Variables	VIF	1/VIF
GDP	1.42	0.702497
CPI	1.35	0.739360
BCIR	1.51	0.661561
EXR	1.34	0.748452
HS	1.19	0.841246
Mean VIF	1.36	

Source: Calculation by the author

As can be observed in the previous table, every single independent variable has a VIF coefficient value less than 3, which leads to the conclusion that there is no multicollinearity between the variables, so the set model is valid. In Table 3, it is evident that the independent variables have a coefficient of correlation below $r=0.90$, which also leads to the conclusion that there is no multicollinearity (Pallant, 2011).

Also, in this research, we will show whether the residuals are normally distributed or not through the Shapiro-Wilk W test. Two hypotheses will be put forward, namely:

Ho – The residuals have a normal distribution, and

H1 – The residuals do not have a normal distribution.

The results of the Shapiro-Wilk W test are presented in the following table:

Table 5 - Results of the Shapiro Wilk W test for Testing the Normal Distribution of Residuals

Variable	Obs	W	V	z	Prob>z
U	40	0.96975	1.196	0.376	0.35341

Source: Calculation by the author

From the previous table and according to the results of the Shapiro Wilk test, it can be seen that the probability is greater than 5%, which leads to the conclusion that the null hypothesis is accepted and that the residuals have a normal distribution, and the alternative hypothesis is rejected.

In statistics, a sequence of random variables is homoscedastic if all of its random variables have the same finite variance, where this property is known as homogeneity of variance. A complementary term is called heteroskedasticity, also known as heterogeneity of variance. Also, in this research, we will examine the homoscedasticity and heteroscedasticity of the residuals with the help of the Breusch-Pagano test, by setting the following hypotheses:

Ho – Residuals are homoscedastic (have constant variance), and

H1 – Residuals are heteroskedastic.

The results of the Breusch-Pagan test are presented in the following table:

Table 6 - Results of the Breusch-Pagan Test for Testing the Homoscedasticity and Heteroscedasticity of the Residuals

chi 2(1)	0.86
Prob > chi2	0.3547

Source: Calculation by the author

From Table 6, and according to the results of the Breusch-Pagan test, it can be seen that the probability is greater than 5% and amounts to 35.47%, which leads to the conclusion that the null hypothesis is accepted and that the residuals have a constant variance, which is desirable for the model and the alternative hypothesis is rejected.

Table 7 shows the results of fixed effects (FE) regression between selected variables in the model. The total number of observations is 40, which makes the model relatively representative. The empirical value of the F-test for 8 degrees of freedom in numbering and 32 degrees of freedom in denomination was 290.09. The independent variables that showed the most significant correlation with the dependent variable, i.e., the housing price index in the model, and whose p-value is less than 5% are the following: consumer price index (0.000), interest rate on bank loans (0.000) and exchange rate of dinar to euro (0.003).

Table 7 - Regression model of fixed effects between dependent (HPI) and independent variables on the real estate market of the Republic of Serbia for the period: 2014:Q1-2023:Q4

Fixed effects within the regression					Number of observations = 40	
R ² : within = 0.9791					Number of groups = 4	
Between = 0.9454						
Total: 0.9788					Observations by group min = 10	
Average: 10.0						
Maksimum: 10						
F(8, 32) = 290.09						
Prob>F = 0.000						
HPI (dependent)	Coeff.	St.error	t	P> t	[95% Confidence interval]	
GDP	0.0035	0.3209	0.01	0.991	-0.6510	0.6581
CPI	2.1268	0.0746	28.48	0.000	1.9745	2.2791
BCIR	-3.0291	0.4151	-7.30	0.000	-3.8756	-2.1825

EXR	-1.5857	0.4851	-3.27	0.003	-2.5752	-0.5963
HS	0.8152	0.8807	0.93	0.362	-0.9810	2.6115
_cons	105.798	62.919	1.68	0.103	-22.525	234.123
Sigma_u	0.8695					
Sigma_e	5.6841					
Rho	0.02286					

Source: Calculation by the author

Also, from the previous table, it can be noted that there is an inverse relationship between the interest rate on bank loans and the housing price index (-3.0291). Therefore, this means that if the BCIR decreases by 1% then the HPI will increase by about 3.029 assuming other variables are considered unchanged. According to the assessment of the banks, the growth of residential real estate prices and interest rates were factors in reducing the demand of the household sector for loans at the end of 2022. The standards for approving loans on the supply side have been tightened since the second quarter of 2022, which was mostly influenced by the increased costs of financing sources, less competition in the banking sector, and uncertainty in terms of the general economic situation, which was reflected in a reduced willingness to take risks (National Bank of Serbia, 2022).

Likewise, negative causality was recorded between the dinar exchange rate against the euro and the housing price index (-1,586). According to Asal (2018), the exchange rate is an important indicator in determining the prices of residential real estate. Namely, a weak exchange rate compared to foreign countries can have a positive effect on real estate prices. Foreign investors or the household sector will have a greater desire to buy domestic real estate in another country when the domestic currency depreciates against the foreign currency. In this case, domestic residential real estate becomes cheaper for foreign investors whose increased demand for real estate abroad will increase prices in the real estate market.

The values of the F statistic and the Wald chi 2 test are significant at a significance level of less than 5% for the observed sets of variables and data, which indicates the fact that the proposed model fits the data well. Likewise, the results of the analysis show that about 97.88% of the change in the housing price index in the Republic of Serbia is explained by certain independent variables used in this model (Table 8).

Table 8 - Random effects regression (GLS) between dependent (HPI) and independent variables on the real estate market of the Republic of Serbia for the period: 2014 - 2023.

Random effects GLS regression					Number of observations = 40	
R ² : within = 0.9791					Number of groups = 4	
Between = 0.9454						
Total: 0.9788					Observations by group min = 10	
Average: 10.0						
Maximum: 10						
Wald chi 2 (5) =1.569,14						
Prob>F = 0.000						
HPI (dependent)	Coeff.	St. Error	t	P> t	[95% Confidence interval]	
GDP	0.0075	0.3090	0.02	0.980	-0.5982	0.6134
CPI	2.1294	0.0717	29.66	0.000	1.9887	2.2701

BCIR	-3.0213	0.3995	-7.56	0.000	-3.8043	-2.2383
EXR	-1.5495	0.4658	-3.33	0.001	-2.4625	-0.6365
HS	0.8842	0.8461	1.04	0.296	-0.7742	2.5426
_cons	101.037	60.393	1.67	0.094	-17.330	219.40
Sigma_u	0					
Sigma_e	5.684					
Rho	0					

Source: Calculation by the author

Based on the results of the GLS regression model on the dependent variable, namely the housing price index (HPI), the CPI independent variable had the strongest positive impact, which is indicated by the coefficient value of 2.1294 and the probability value of 0.000. Therefore, this means that if the CPI increases by 1% then the HPI will increase by 2.1294 assuming other variables are considered unchanged. The results of this research are supported by studies conducted by Zamillaili and Qoyum (2021), Panagiotidis and Printzis (2016), Fanama and Pratikto (2019), Fauzia (2019) and Mohan et al. (2019) which show that inflation has a significant positive effect on prices real estate. Theoretically, the relationship between the CPI and the real estate price index explains that an increase in the CPI can cause an increase in the prices of construction materials, labor costs, and other operating costs related to the construction and maintenance of real estate. Consequently, this can lead to an increase in real estate prices.

On the other hand, from Table 8, it can be noted that the strongest negative relationship was recorded between the interest rate on bank loans and the housing price index (-3.0213) at a significance of less than 5%, which can be concluded that with the decrease in interest rates on loans, the demand increases for loans as well as the demand for real estate. Balqis and Purwono (2021) note that interest rates are always closely monitored so that they do not have a large impact when they rise because they will slow down the real sector. However, it should be noted that interest rates differ from bank to bank despite the threshold set by the National Bank. This means that a lower interest rate will increase the purchasing power of an individual when buying an apartment because the interest paid is lower. In this regard, it will act to increase the demand for housing loans as well as housing prices. In recent years, the turnover in the real estate market has increased both in the Republic of Serbia and in other surrounding countries. Therefore, in recent years, prices on the real estate market have grown almost as much as on a global level, the growth of which was influenced by many factors such as: favorable trends in the labor market, low interest rates, the search for alternative investments, increased work from home due to the COVID-19 pandemic and other factors (National Bank of Serbia, 2022).

Also, the exchange rate of the dinar against the euro is an independent variable that has a significant negative impact on the housing price index, as evidenced by the probability value of 0.001, which is less than 5%, and the coefficient value of -1.5495. This means that if the exchange rate of the dinar against the euro increases by 1%, the housing price index will consequently decrease by about -1.5495, assuming that other variables are considered unchanged. During 2022, the dinar strengthened against the euro by about 0.2%. In the same period, due to the weakening of the euro against the dinar on the international financial market, the dinar weakened against the dollar by about 5.7% (National Bank of Serbia, 2022). In theory, if the exchange rate of the domestic currency depreciates, the prices of domestic real estate assets, such as housing, will become cheaper for foreign investors, and conditions like this can increase capital inflows into the real estate sector and raise housing prices.

In addition, the exchange rate can also affect the price of production of construction materials, because with an increase in the exchange rate of the domestic currency, there may be an increase in the prices of imported construction materials, and in the end, the prices of real estate will also increase. Magdalena (2015) states that the exchange rate is important in the purchase of real estate because when the currency weakens the amount of principal plus interest becomes higher to pay. Therefore, the cost of capital increases due to the exchange rate and ultimately the price of real estate increases. According to Sumer and Ozorhan (2020), exchange rates can influence investors perception of considering housing as an investment option. Therefore, when the domestic exchange rate weakens, more must be spent on owning property and in the long term it is better to combine various other investment instruments.

Table 9 - Results of the Hausman Test Between Independent Variables for the Period: 2014-2023

Variables	(b) Fixed effects model	(B) Random effects model	(b-B) Difference	Sqrt (diag (V_b-V_B)) S.E.
GDP	0.0035446	0.0075657	-0.0040211	0.0864171
CPI	2.12682	2.129453	-0.002633	0.0205701
BCIR	-3.029115	-3.021348	-0.0077671	0.1126068
EXR	-1.585774	-1.54952	-0.0362541	0.1355381
HS	0.8152433	0.8842281	-0.0689848	0.2444094

Source: Calculation by the author

$$\begin{aligned} \text{chi2}(5) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 0,12 \\ \text{Prob}>\text{chi2} &= 0,9998 \end{aligned}$$

Given that the chi-square value is equal to zero, as well as the fact that the p-value of individual independent variables is equal to zero or slightly greater than zero, but less than 5% (for variables such as consumer price index, interest rates on bank loans and the exchange rate of dinars against the euro) then it can be concluded that certain independent variables had an impact on the dependent variable. Also, according to the results of the Hausman test, the probability is greater than 5% and amounts to 0.9998, which leads to the conclusion that the null hypothesis, i.e., GLS regression of random effects, is accepted and the alternative hypothesis, i.e., the fixed effects model, is rejected.

Concluding Considerations

The residential real estate market is of vital importance to the residents of any country, as well as to the Government and related state governing bodies. Real estate as a form of property has many characteristics that distinguish it from other forms of property in the markets. The offer of real estate is local, where to offer real estate to the market at all, takes significantly more time than with other products, considering the time frame of the planning and construction phases of real estate. For example, rental prices can remain at the same level for a longer period regardless of the market situation due to the long-term rental agreement. Certain limitations of the residential real estate market are related to transparency where most transactions are done through bilateral negotiations. Also, the liquidity of this market is limited due to high transaction costs, where buyers mainly rely on bank loans. In this regard, the aforementioned characteristics cause residential real estate prices to move in different patterns than other forms of property.

Over the past few years, the turnover in the real estate market has increased both in the Republic of Serbia and in other countries of the region. Therefore, real estate prices grew almost at the global level, which was influenced by numerous factors such as more favorable trends in the labor market, low interest rates, the search for alternative types of investments and other factors.

The paper includes the theoretical and empirical part of the research, which was carried out with the help of correlation and regression analysis. The main goal of this paper was to investigate the impact of certain macroeconomic and banking indicators on real estate prices in the Republic of Serbia for the period from the first quarter of 2014 to the fourth quarter of 2023. Therefore, in this research, the effects of independent variables and their influence on the dependent variable were used using the unified OLS regression model (FE) and the regression model of random effects (GLS) with the help of the Hausman test. The application of the multiple linear regression model indicates that the housing price index in the last 10 years has a positive and highly significant correlation with the consumer price index, and a negative correlation with the interest rate on bank loans and the dinar exchange rate against the euro. In contrast to previous research results, the growth of the gross domestic product as well as the growth of household savings do not seem statistically significant. Therefore, it is suggested to the Government to maintain the stability of the consumer price index in order to maintain the stability of real estate prices. In terms of testing the set hypotheses, the results of the research using the Hausman test showed that the probability is greater than 5%, which points to the conclusion that the null hypothesis, i.e., the GLS regression of random effects, is accepted and the alternative hypothesis, i.e., the fixed effects model is rejected. The question of the importance of the real estate market is relevant again due to the justified perception of young people and households where it is almost impossible to buy their real estate.

The limited relevant literature on this topic also limits the development of further research into the factors influencing real estate prices. In this regard, further research involving a longer time period and a larger number of countries is needed to complement and develop the understanding of the determinants of real estate prices. Likewise, the author's new research in a given issue can be expanded by including a larger number of independent variables. This research can also help estimate future changes in housing price indices that are primarily conditioned by changes in observed macroeconomic and banking variables.

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EMOCIONALNA ISCRPLJENOST ZAPOSLENIH U BANKARSKOM SEKTORU: EMPIRIJSKI REZULTATI IZ SRBIJE

Prof. dr Jelena Lukić Nikolić

Vanredni profesor, Visoka škola modernog biznisa
jelena.lukic@mbs.edu.rs

Mr Vladimir Mirković

Magistar ekonomskih nauka,
Društvo ekonomista Beograda
vladamirkovic@orion.rs

Rezime: Emocionalna iscrpljenost je postala sveprisutna pojava u bankarskom sektoru. U ovom radu je sprovedeno empirijsko istraživanje primenom posebno koncipiranog upitnika sa ciljem da se sagleda emocionalna iscrpljenost zaposlenih u bankarskom sektoru u Srbiji u odnosu na njihov pol, dužinu rada u banci i kontakt sa klijentima. Tokom 2022. godine prikupljeni su odgovori od 136 ispitanika. U procesu obrade podataka primenjeni su neparametarski testovi (Mann-Whitney U-test i Kruskal-Wallisov H-test). Rezultati istraživanja su pokazali da je osećaj emocionalne iscrpljenosti zastupljeniji i učestaliji kod muškaraca, u poređenju sa ženama, ali da te razlike nisu statistički značajne. Takođe, rezultati istraživanja su ukazali na statistički značajne razlike u odgovorima ispitanika kod tvrdnji vezanih za osećaj umora i osećaj da previše rade u zavisnosti od njihovog radnog staža u bankama. Istovremeno, postoje statistički značajne razlike u odgovorima ispitanika koji imaju kontakt sa klijentima na svom radnom mestu i onih koji nemaju kontakt.

Ključne reči: bankarski sektor, emocionalna iscrpljenost, sagorevanje, stres, ljudski resursi, organizaciono ponašanje

JEL klasifikacija: I31, M54, J22, G21

Uvod

Izraz sagorevanje (engl. burnout) prvi put je upotrebio američki psiholog i psihoanalitičar Herbert Frojdenberger (Herbert Freudenberg) 1970-ih godina da bi opisao način na koji su volonteri koji su radili sa zavisnicima od opojnih sredstava s vremenom postali emotivno iscrpljeni i demotivisani. Sagorevanje je stanje mentalne i fizičke iscrpljenosti uzrokovane profesionalnim životom (Freudenberg, 1975). Danas je ovaj sindrom široko zastupljen u poslovnoj praksi. Zaposleni na svim poslovima i pozicijama bivaju kad tad izloženi efektu sagorevanja. Brojna istraživanja su pokazala da je efekat sagorevanja i iscrpljenosti zaposlenih posebno izražen u bankarskom sektoru (Khalid et al., 2020; Tehrani et al., 2021; Tafi et al., 2022). Kao ključni razlozi za takvo stanje identifikovani su: pritisak da se ostvare što bolji rezultati, velik obim posla, stalne tehnološke promene, izražena konkurencija, nesigurnost radnog mesta (Koyuncu et al., 2021; Lubbadeh, 2021; Awwad et al., 2022). Iscrpljenost zaposlenih u bankama posebno je bila izražena u doba Covid-19 pandemije kada se većina zaposlenih suočila sa radom od kuće gde nije imala adekvatne uslove za rad (Lukić Nikolić & Mirković, 2023).

Cilj ovog rada je da sagleda iscrpljenost zaposlenih u bankarskom sektoru u Srbiji. Prvi deo rada je teorijske prirode i obuhvata definisanje iscrpljenosti i faktore koji do njega dovode, kao i ključne negativne efekte koji se javljaju kod zaposlenih. Drugi deo rada je posvećen metodologiji sprovedenog istraživanja, prikazu i diskusiji dobijenih rezultata.

Pregled literature

Emocionalna iscrpljenost zaposlenih predstavlja nepoželjnu pojavu koja ima brojne negativne efekte ne samo po zaposlene, već i po celu kompaniju. Prema definiciji, emocionalna iscrpljenost predstavlja iscrpljivanje zaposlenih zbog visokih interpersonalnih zahteva. Učestalo prisustvo emocionalne iscrpljenosti može da dovede do osećanja da zaposleni nemaju kontrolu nad svojom trenutnom situacijom i da se osećaju „zarobljenim“ u svom radnom okruženju, bez mogućnosti da ga promene i prilagode (Cavanaugh et al., 2000). Emocionalna iscrpljenost predstavlja neusklađenost između zahteva posla i ličnih resursa – često se dešava da su zahtevi posla preveliki, a lični resursi ograničeni. Svaki pojedinac može da oseti emocionalnu iscrpljenost u različitim situacijama, u različitim vremenima ili radnim okruženjima (Yang, 2023).

Iscrpljenost može da nastane kao rezultat preobimnih i kompleksnih radnih zadataka, potrebe da se stalno bude dostupan i na raspolaganju, pritiska vremenskih rokova ili nedostatka znanja i veština za dodeljene zadatke i aktivnosti (Maslach et al., 2001). Pregledom literature mogu se izdvojiti određene pojave koje mogu da dovedu do iscrpljenosti zaposlenih (Driskell et al., 2006; Grace Saunders, 2021):

Preopterećenost poslom i radnim zadacima - Kada zaposleni imaju optimalnu količinu posla i radnih zadataka, oni imaju priliku da na kvalitetan način, bez stresa realizuju postavljene zadatke, da se adekvatno odmore, pronađu vreme za dalji rast i razvoj. U situacijama kada su zaposleni opterećeni velikim obimom posla i radnih zadataka, kod njih se javlja osećaj iscrpljenosti. U praksi su brojna istraživanja pokazala da je jedan od ključnih uzroka iscrpljenosti zaposlenih preopterećenost radnim zadacima i aktivnostima koji su obimni, hitni i kompleksni (Leiter & Maslach, 2005; Casserley & Megginson, 2009).

Pritisak vremenskih rokova - Zaposleni često moraju da završe zadatke i realizuju ciljeve u kratkim vremenskim rokovima ili moraju da pronađu rešenja za nastale probleme sa kojima se prethodno nisu suočavali i koji su za njih novi i neuobičajeni.

Pritisak da se ostvari što bolji rezultat, bez grešaka i u okviru definisanih rokova - Zaposleni često osećaju pritisak od menadžera i tim lidera da se ostvare što bolji rezultati rada, obično u kratkim vremenskim rokovima, što dovodi do stresa, preteranog rada i osećaja iscrpljenosti.

Pored toga, pojedini autori su uočili da iscrpljenost zaposlenih može da nastane ukoliko se zaposleni previše identifikuje sa poslom i kada naruši ravnotežu između posla i svog privatnog života (Moss, 2021). Zaposleni nekada imaju i želju da svima pomognu i da uvek budu na usluzi kolegama i nadređenima. Još jedan izvor iscrpljenosti zaposlenih potiče i iz intenzivnog direktnog rada sa klijentima. Dodatno, lične karakteristike zaposlenih među kojima su pol, starost, bračni status takođe mogu da utiču na osećaj iscrpljenosti i efekat sagorevanja na radnom mestu (Ogresta et al., 2008).

U novije vreme se smatra da do efekta sagorevanja kod zaposlenih može da dođe i ukoliko vrednosti i stavovi zaposlenih nisu u skladu sa organizacionim vrednostima i stavovima (Maslach & Leiter, 2008).

Iscrpljenost može da se manifestuje kao fizička letargija - nemogućnost da se ustane iz kreveta ili potreba i želja da se preleži ostatak dana nakon što se zaposleni vrate sa posla. Isto tako, iscrpljenost može da se manifestuje i kao stalna zabrinutost zaposlenih (Casserley & Megginson, 2009). Emocionalna iscrpljenost zaposlenih dovodi do stresa i efekta sagorevanja, a samim tim i do brojnih negativnih posledica među kojima su (Schaufeli & Enzmann, 1998):

- Stalni osećaj psihičke, emotivne i kognitivne iscrpljenosti;
- Anksioznost, osećaj nemoći, apatije, beznađa;
- Problemi sa snom, nesanica, gastroenterološki problemi, promene apetita, glavobolje;
- Smanjenje produktivnosti i rezultata rada;
- Smanjenje motivacije i pad zadovoljstva;
- Okretanje zaposlenih sa povećanom konzumiranju alkohola.

Pored navedenog, kod zaposlenih dolazi do gubitka energije, entuzijazma, strasti prema poslu, stalnog osećaja preopterećenosti, iscrpljenosti i stresa, kao i gubitka samopouzdanja i okretanja ka negativnim stavovima i pristupima prema svima. Sagorevanje negativno utiče na kvalitet međuljudskih odnosa, ali isto tako na rezultate pojedinca, tima i organizacije. Ključne posledice sagorevanja su povećanje apsentizma i fluktuacije, smanjenje efikasnosti, produktivnosti, motivacije i angažovanosti zaposlenih (Lazarević & Lukić Nikolić, 2024). Česte izjave zaposlenih koji su iscrpljeni u svom radnom okruženju odnose se na njihovu frustriranost, zatim nemogućnost da obave sve zadatke i aktivnosti, gubitak entuzijazma i volje, osećaj nezadovoljstva i depresije (Maslach & Leiter, 1997).

Metodologija istraživanja

Ključna istraživačka pitanja (IP) postavljena u ovom radu su:

IP 1: Da li postoje razlike u osećaju emocionalne iscrpljenosti između muškaraca i žena?

IP2: Da li postoje razlike u osećaju emocionalne iscrpljenosti u zavisnosti od dužine rada u bankama?

IP3: Da li postoje razlike u osećaju emocionalne iscrpljenosti između zaposlenih koji imaju kontakt sa klijentima i onih koji nemaju?

U radu je sprovedeno empirijsko istraživanje u kojem su učestvovali zaposleni u bankama u Srbiji. Podaci su prikupljeni tokom 2022. godine pomoću upitnika koji je obuhvatao nekoliko profilnih pitanja i mernu skalu „Emocionalna iscrpljenost zaposlenih“. Merna skala je obuhvatila sedam tvrdnji koje se odnose na emocionalnu iscrpljenost zaposlenih na radnom mestu. Mogući odgovori ispitanika bili su koncipirani u vidu skale koja je označavala frekventnost: svaki dan, nekoliko puta nedeljno, jednom nedeljno, nekoliko puta mesečno, najmanje jednom mesečno, nekoliko puta godišnje i nikad. U istraživanju je učestvovalo ukupno 136 ispitanika koji rade u bankama u Srbiji.

Prikupljeni odgovori su obrađeni primenom Microsoft® Excel® 2019 i Statističkog softvera za društvene nauke (Statistical Software for Social Sciences (SPSS), version 21). Cronbach alpha koeficijent za mernu skalu „Emocionalna iscrpljenost zaposlenih“ iznosio je 0,965 što ukazuje na visok stepen pouzdanosti merne skale (DeVellis, 2003). Kolmogorov Smirnov test pokazao je vrednost 0,186 uz Sig.=0,000, što ukazuje da pretpostavka normalnosti raspodele podataka nije zadovoljena, usled čega su primenjeni neparametarski statistički testovi (Mann-Whitney U-test za poređenje razlika između dve grupe i Kruskal-Wallis H-test za poređenje razlika između tri grupe ispitanika). Levenov test pokazao je homogenost varijanse ($p > 0,05$).

Rezultati istraživanja

U tabeli 1 prikazani su odgovori ispitanika na profilna pitanja. Skoro dve trećine ispitanika su žene (65,4%), dok nešto više od jedne trećine ispitanika čine muškarci (34,6%). Najveći broj ispitanika koji je učestvovao u ovom istraživanju radi u bankarskom sektoru do 5 godina (43,4%), a zatim slede oni ispitanici koji rade duže od 10 godina (39,0%). Nešto manje od jedne petine ispitanika radi u bankarskom sektoru od 6 do 10 godina (17,6%). U pogledu kontakta sa klijentima, skoro dve trećine ispitanika nema kontakt sa klijentima (64,7%), dok nešto više od jedne trećine ostvaruje kontakt sa klijentima (35,3%).

Tabela 1: Osnovne informacije o ispitanicima

	N	%
Pol		
Muški	47	34,6
Ženski	89	65,4
Dužina rada u bankama		
Do 5 godina	59	43,4
Od 6 do 10 godina	24	17,6
Preko 10 godina	53	39,0

Kontakt sa klijentima		
Ostvarujem kontakt sa klijentima	48	35,3
Bez kontakta sa klijentima	88	64,7

Izvor: Autori

U narednim tabelama (od Tabele 2 do Tabele 8) prikazani su broj i frekvencija odgovora ispitanika na različite tvrdnje u okviru merne skale „Emocionalna iscrpljenost zaposlenih“. Odgovori su prikazani u odnosu na pol ispitanika, dužinu rada u bankama i da li ispitanici imaju kontakt sa klijentima.

Tabela 2: Odgovori ispitanika na tvrdnju „Osećam se emotivno istrošeno zbog svog posla“

Osećam se „emotivno istrošeno“ zbog svog posla														
	Muškarci		Žene		Do 5 godina rada		Od 6 do 10 godina rada		Preko 10 godina rada		Kontakt sa klijentima		Bez kontakta sa klijentima	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Svaki dan	4	8,51	9	10,11	6	10,17	2	8,33	5	9,43	5	10,42	8	9,09
Nekoliko puta nedeljno	7	14,89	9	10,11	7	11,86	1	4,17	8	15,09	7	14,58	9	10,23
Jednom nedeljno	4	8,51	8	8,99	4	6,78	3	12,50	5	9,43	5	10,42	7	7,95
Nekoliko puta mesečno	7	14,89	14	15,73	8	13,56	6	25,00	7	13,21	6	12,50	15	17,05
Najmanje jednom mesečno	4	8,51	15	16,85	6	10,17	2	8,33	11	20,75	6	12,50	13	14,77
Nekoliko puta godišnje	17	36,17	26	29,21	21	35,59	8	33,33	14	26,42	13	27,08	30	34,09
Nikad	3	6,38	8	8,99	6	10,17	2	8,33	3	5,66	5	10,42	6	6,82
Bez odgovora	1	2,13	-	-	1	1,69	-	-	-	-	1	2,08	-	-
Ukupno	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Izvor: Autori

Oko 30% (31,91%) muškaraca učestalo oseća emotivnu istrošenost zbog posla (odgovori: svaki dan, nekoliko puta nedeljno i jednom nedeljno), dok je to slučaj kod 29,21% žena. Više od 40% (43,38%) ispitanika koji rade preko 10 godina u bankama oseća emotivnu istrošenost zbog posla. Nakon njih, sledi 28,81% ispitanika koji rade do 5 godina u bankama koji učestalo osećaju emotivnu istrošenost zbog posla, dok je to slučaj kod 25,0% ispitanika koji rade od 6 do 10 godina u bankama. Više od 35% (35,42%) ispitanika koji imaju kontakt sa klijentima učestalo oseća emotivnu istrošenost zbog posla, dok je to slučaj kod 27,27% ispitanika koji nemaju kontakt sa klijentima.

Tabela 3: Odgovori ispitanika na tvrdnju „Osećam se iscrpljeno na kraju radnog dana“

Osećam se iscrpljeno na kraju radnog dana														
	Muškarci		Žene		Do 5 godina rada		Od 6 do 10 godina rada		Preko 10 godina rada		Kontakt sa klijentima		Bez kontakta sa klijentima	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Svaki dan	10	21,28	14	15,73	8	13,56	4	16,67	12	22,64	13	27,08	11	12,50
Nekoliko puta nedeljno	5	10,64	14	15,73	6	10,17	5	20,83	8	15,09	9	18,75	10	11,36

Jednom nedeljno	7	14,89	7	7,78	6	10,17	3	12,50	5	9,43	6	12,50	8	9,09
Nekoliko puta mesečno	6	12,77	19	21,35	11	18,64	4	16,67	10	18,87	6	12,50	19	21,59
Najmanje jednom mesečno	10	21,28	19	21,35	11	18,64	6	25,00	12	22,64	5	10,42	24	27,27
Nekoliko puta godišnje	8	17,02	15	16,85	15	25,42	2	8,33	6	11,32	8	16,67	15	17,05
Nikad	1	2,13	1	1,12	2	3,39	-	-	-	-	1	2,08	1	1,14
Ukupno	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Izvor: Autori

Od ukupnog broja muškaraca, skoro 50% (46,81%) se oseća iscrpljeno na kraju radnog dana i to svaki dan, nekoliko puta nedeljno i jednom nedeljno, dok je to slučaj kod skoro 40% (39,24%) žena. Rezultati pokazuju da polovina zaposlenih koji radi preko 10 godina u bankama oseća iscrpljenost na kraju radnog dana svaki dan, nekoliko puta nedeljno i jednom nedeljno, dok je to slučaj kod 47,16% ispitanika koji rade od 6 do 10 godina i 33,90% onih koji rade do 5 godina. Skoro 60% (58,33%) ispitanika koji imaju kontakt sa klijentima na svom radnom mestu imaju učestali osećaj iscrpljenosti na kraju radnog dana, u poređenju sa 32,95% ispitanika koji nemaju kontakt sa klijentima.

**Tabela 4: Odgovori ispitanika na tvrdnju
„Osećam se umorno čim se probudim ujutro jer je novi radni dan preda mnom“**

Osećam se umorno čim se probudim ujutro jer je novi radni dan preda mnom														
	Muškarci		Žene		Do 5 godina rada		Od 6 do 10 godina rada		Preko 10 godina rada		Kontakt sa klijentima		Bez kontakta sa klijentima	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Svaki dan	6	12,77	7	7,87	5	8,47	3	12,50	5	9,43	6	12,50	7	7,95
Nekoliko puta nedeljno	6	12,77	9	10,11	5	8,47	1	4,17	9	16,98	7	14,58	8	9,09
Jednom nedeljno	3	6,38	9	10,11	4	6,78	3	12,50	5	9,43	5	10,42	7	7,95
Nekoliko puta mesečno	7	14,89	12	13,48	6	10,17	2	8,33	11	20,75	7	14,58	12	13,64
Najmanje jednom mesečno	6	12,77	16	17,98	9	15,25	4	16,67	9	16,98	5	10,42	17	19,32
Nekoliko puta godišnje	14	29,79	26	29,21	22	37,29	9	37,50	9	16,98	12	25,00	28	31,82
Nikad	5	10,64	10	11,24	8	13,56	2	8,33	5	9,43	6	12,50	9	10,23
Ukupno	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Izvor: Autori

Nešto više od 30% muškaraca (31,92%) se učestalo oseća umorno čim se ujutru probudi jer su svesni da je novi radni dan pred njima, dok je to slučaj kod 28,09% žena. Od ukupnog broja ispitanika, njih 35,84% koji rade preko 10 godina u bankama učestalo osećaju umor zbog novog radnog dana koji je pred njima, dok je to slučaj kod 29,17% ispitanika koji rade od 6 do 10 godina i 23,72% ispitanika koji rade do 5 godina. Više od dve trećine ispitanika (37,5%) koji imaju kontakt sa klijentima imaju učestali (svaki dan, nekoliko puta nedeljno, jednom nedeljno) osećaj umora čim se probude jer su svesni da je novi radni dan pred njima, dok je to slučaj kod 24,99% ispitanika koji nemaju kontakt sa klijentima.

Tabela 5: Odgovori ispitanika na tvrdnju Osećam da „sagorevam“ zbog svog posla

Osećam da „sagorevam“ zbog svog posla														
	Muškarci		Žene		Do 5 godina rada		Od 6 do 10 godina rada		Preko 10 godina rada		Kontakt sa klijentima		Bez kontakta sa klijentima	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Svaki dan	8	17,02	9	10,11	10	16,95	3	12,50	4	7,55	10	20,83	7	7,95
Nekoliko puta nedeljno	6	12,77	16	17,98	5	8,47	4	16,67	13	24,53	8	16,67	14	15,91
Jednom nedeljno	4	8,51	4	4,49	3	5,08	1	4,17	4	7,55	2	4,17	6	6,82
Nekoliko puta mesečno	7	14,89	4	4,49	5	8,47	4	16,67	2	3,77	6	12,50	5	5,68
Najmanje jednom mesečno	6	12,77	14	15,73	7	11,86	4	16,67	9	16,98	7	14,58	13	14,77
Nekoliko puta godišnje	12	25,53	34	38,20	21	35,59	6	25,00	19	35,851	3	27,08	33	37,50
Nikad	4	8,51	8	8,99	8	13,56	2	8,33	2	3,77	2	4,17	10	11,36
Ukupno	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Izvor: Autori

Više od dve trećine muškaraca (38,30%) ima učestali osećaj da „sagoreva“ zbog svog posla, dok je to slučaj kod 32,58% žena. Znatno veći broj muškaraca (14,89%) je odgovorio da osećaj sagorevanja oseća nekoliko puta mesečno, u poređenju sa 4,49% žena. Najveći broj ispitanika koji učestalo oseća da sagoreva zbog posla spada u grupu ispitanika koji rade u bankama preko 10 godina (39,63%), zatim slede ispitanici koji rade od 6 do 10 godina (33,34%) i ispitanici koji rade do 5 godina (30,5%). Preko 40% (41,67%) ispitanika koji ostvaruju kontakt sa klijentima učestalo osećaju da sagorevaju zbog svog posla, u poređenju sa onim ispitanicima koji nemaju kontakt sa klijentima (30,68%).

Tabela 6: Odgovori ispitanika na tvrdnju „Osećam se frustrirano zbog svog posla“

Osećam se frustrirano zbog svog posla														
	Muškarci		Žene		Do 5 godina rada		Od 6 do 10 godina rada		Preko 10 godina rada		Kontakt sa klijentima		Bez kontakta sa klijentima	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Svaki dan	7	14,89	9	10,11	7	11,86	3	12,50	6	11,32	7	14,58	9	10,23
Nekoliko puta nedeljno	6	12,77	13	14,61	6	10,17	3	12,50	10	18,87	6	12,50	13	14,77
Jednom nedeljno	4	8,51	6	6,74	2	3,39	4	16,67	4	7,55	6	12,50	4	4,55
Nekoliko puta mesečno	4	8,51	7	7,87	5	8,47	1	4,17	5	9,43	5	10,42	6	6,82
Najmanje jednom mesečno	2	4,26	6	6,74	4	6,78	-	-	4	7,55	2	4,17	6	6,82
Nekoliko puta godišnje	13	27,66	27	30,34	17	28,81	9	37,50	14	26,42	12	25,00	28	31,82
Nikad	11	23,40	21	23,60	18	30,51	4	16,67	10	18,87	10	20,83	22	25,00
Ukupno	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Izvor: Autori

Od ukupnog broja ispitanika, 36,17% muškaraca učestalo ima osećaj frustriranosti zbog svog posla, dok je to slučaj kod 31,46% žena. U pogledu dužine radnog iskustva u bankama, najveći broj ispitanika (41,67%) koji radi od 6 do 10 godina ima učestali osećaj frustriranosti zbog svog posla. Posle njih slede oni ispitanici koji rade preko 10 godina (37,74%) i na kraju oni ispitanici koji rade do 5 godina u bankama (25,42%). Treba istaći i podatak da 30,51% ispitanika koji radi do 5 godina u bankama nije nikad imalo osećaj frustriranosti zbog posla. Preko trećine ispitanika (34,58%) koji imaju kontakt sa klijentima ima učestali osećaj frustriranosti zbog svog posla, dok je to slučaj kod 29,55% ispitanika koji nemaju kontakt sa klijentima.

Tabela 7: Odgovori ispitanika na tvrdnju „Imam osećaj da previše radim“

Imam osećaj da previše radim														
	Muškarci		Žene		Do 5 godina rada		Od 6 do 10 godina rada		Preko 10 godina rada		Kontakt sa klijentima		Bez kontakta sa klijentima	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Svaki dan	12	25,53	12	13,48	11	18,64	4	16,67	9	16,98	14	29,17	10	11,36
Nekoliko puta nedeljno	6	12,77	13	14,61	5	8,47	5	20,83	9	16,98	3	6,25	16	18,18
Jednom nedeljno	3	6,38	7	7,87	3	5,08	4	16,67	3	5,66	6	12,50	4	4,55
Nekoliko puta mesečno	2	4,26	9	10,11	2	3,39	1	4,17	8	15,09	5	10,42	6	6,82
Najmanje jednom mesečno	10	21,28	15	16,85	10	16,95	4	16,67	11	20,75	7	14,58	18	20,45
Nekoliko puta godišnje	12	25,53	25	28,09	22	37,29	3	12,50	12	22,64	9	18,75	28	31,82
Nikad	2	4,26	7	7,87	6	10,17	2	8,33	1	1,89	3	6,25	6	6,82
Bez odgovora	-	-	1	1,12	-	-	1	4,17	-	-	1	2,08	-	-
Ukupno	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Izvor: Autori

Preko 40% (44,68%) muškaraca ima učestali osećaj da previše radi na poslu, dok je to slučaj kod 35,96% žena. Više od polovine ispitanika (54,17%) koji rade od 6 do 10 godina u bankama imaju učestali osećaj da previše rade, dok je to slučaj kod skoro 40% (39,62%) ispitanika koji rade preko 10 godina. Takođe, skoro jedna trećina (32,19%) ispitanika koja radi do 5 godina ima učestali osećaj da previše radi. Skoro polovina ispitanika (47,92%) koji imaju kontakt sa klijentima imaju učestali osećaj da previše rade, dok je to slučaj kod 34,09% ispitanika koji nemaju kontakt sa klijentima.

Tabela 8: Odgovori ispitanika na tvrdnju „Osećam se kao da nemam više dovoljno energij da se nosim sa izazovima ovog posla“

Imam osećaj da previše radim														
	Muškarci		Žene		Do 5 godina rada		Od 6 do 10 godina rada		Preko 10 godina rada		Kontakt sa klijentima		Bez kontakta sa klijentima	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Svaki dan	6	12,77	5	5,62	4	6,78	2	8,33	5	9,43	5	10,42	6	6,82
Nekoliko puta nedeljno	5	10,64	9	10,11	5	8,47	-	-	9	16,98	6	12,50	8	9,09
Jednom nedeljno	3	6,38	8	8,99	2	3,39	5	20,83	4	7,55	4	8,33	7	7,95

Nekoliko puta mesečno	5	10,64	7	7,87	7	11,86	2	8,33	3	5,66	6	12,50	6	6,82
Najmanje jednom mesečno	1	2,13	7	7,87	5	8,47	-	-	3	5,66	1	2,08	7	7,95
Nekoliko puta godišnje	14	29,79	30	37,71	17	28,81	9	37,5	18	33,96	12	25,00	32	36,36
Nikad	13	27,66	22	24,72	19	32,20	5	20,83	11	20,75	13	27,08	22	25,00
Bez odgovora	-	-	1	1,12	-	-	1	4,17	-	-	1	2,08	-	-
Ukupno	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Izvor: Autori

Skoro 30% (29,79%) muškaraca ima učestali osećaj da nema dovoljno energije da se nosi sa izazovima svog posla, dok je to slučaj kod 24,72% žena. Nešto više od jedne trećine (33,96%) ispitanika koji rade preko 10 godina u bankama imaju osećaj da nemaju više dovoljno energije da se nose sa izazovima svog posla, dok je to slučaj kod 29,16% ispitanika koji rade od 6 do 10 godina i 18,64% ispitanika koji rade do 5 godina. Preko 30% (31,25%) ispitanika koji imaju kontakt sa klijentima imaju učestali osećaj da im nedostaje energije da se nose sa svim izazovima na poslu, dok je to slučaj kod 23,86% ispitanika koji nemaju kontakt sa klijentima.

Pored brojnosti i učestalosti odgovora, značajno je da se detaljnije ispita da li su razlike u odgovorima različitih grupa ispitanika statistički značajne. U nastavku su prikazani rezultati primenjenih statističkih testova.

U tabeli 9 prikazani su rezultati Mann-Whitney U-testa u odnosu na polnu strukturu ispitanika. Dobijene p vrednosti za svaku od tvrdnji u okviru merne skale nisu pokazale da su razlike u odgovorima muškaraca i žena statistički značajne (p vrednost se kreće od 0,188 do 0,945).

Tabela 9: Rezultati Mann-Whitney U-testa (polna struktura ispitanika)

Tvrdnje	Pol	N	MR	z	p
Osećam se „emotivno istrošeno“ zbog svog posla	Muški	46	68,32	-0,069	0,945
	Ženski	89	67,84		
Osećam se iscrpljeno na kraju radnog dana	Muški	47	69,81	-0,286	0,775
	Ženski	89	67,81		
Osećam se umorno čim se probudim ujutro jer je novi radni dan preda mnom	Muški	47	70,82	-0,508	0,611
	Ženski	89	67,28		
Osećam da „sagorevam“ zbog svog posla	Muški	47	74,47	-1,317	0,188
	Ženski	89	65,35		
Osećam se frustrirano zbog svog posla	Muški	47	70,48	-0,435	0,663
	Ženski	89	67,46		
Imam osećaj da previše radim	Muški	47	73,33	-1,179	0,238
	Ženski	88	65,15		
Osećam se kao da nemam više dovoljno energije da se nosim sa izazovima ovog posla	Muški	47	69,63	-0,363	0,716
	Ženski	88	67,13		

Izvor: Autori

U tabeli 10 prikazani su rezultati Mann-Whitney U-testa u odnosu na to da li zaposleni u bankama ostvaruju direktan kontakt sa klijentima ili nemaju kontakt sa njima. Rezultati pokazuju statistički značajnu razliku između ispitanika koji imaju kontakt sa klijentima i onih koji nemaju kod tri tvrdnje. To su tvrdnje „Osećam se iscrpljeno na kraju radnog dana“ ($p=0,023$), zatim „Osećam da sagorevam zbog svog posla“ ($p=0,018$) i „Imam osećaj da previše radim“ ($p=0,044$). Dobijeni rezultati ukazuju da su oni ispitanici koji imaju kontakt sa klijentima češće izloženi ovim negativnim osećanjima u poređenju sa ispitanicima koji nemaju kontakt sa klijentima.

Tabela 10: Rezultati Mann-Whitney U-testa (ostvarivanje kontakta sa klijentima)

Tvrdnje	Kontakt	N	MR	z	p
Osećam se „emotivno istrošeno“ zbog svog posla	Ne	88	66,86	-0,472	0,637
	Da	47	70,13		
Osećam se iscrpljeno na kraju radnog dana	Ne	88	62,91	-2,275	0,023*
	Da	48	78,75		
Osećam se umorno čim se probudim ujutro jer je novi radni dan preda mnom	Ne	88	65,86	-1,076	0,282
	Da	48	73,33		
Osećam da „sagorevam“ zbog svog posla	Ne	88	62,76	-2,359	0,018*
	Da	48	79,02		
Osećam se frustrirano zbog svog posla	Ne	88	65,84	-1,092	0,275
	Da	48	73,39		
Imam osećaj da previše radim	Ne	88	63,13	-2,019	0,044*
	Da	47	77,13		
Osećam se kao da nemam više dovoljno energije da se nosim sa izazovima ovog posla	Ne	88	66,32	-0,701	0,483

Izvor: Autori

U tabeli 11 prikazani su rezultati Kruskal-Wallis H-testa u odnosu na dužinu rada u bankama. Rezultati ukazuju da postoje statistički značajne razlike između ispitanika u zavisnosti od dužine rada u bankama kod dve tvrdnje. To su tvrdnje: „Osećam se umorno čim se probudim ujutro jer je novi radni dan preda mnom“ ($p=0,043$) i tvrdnja „Imam osećaj da previše radim“ ($p=0,047$). Dobijeni rezultati pokazuju da se ispitanici koji rade duže od 10 godina češće osećaju umorno čim se probude ujutro jer je novi radni dan pred njima u poređenju sa drugim ispitanicima, dok ispitanici koji rade od 6 do 10 godina češće imaju osećaj da previše rade u poređenju sa drugim ispitanicima i da su te razlike statistički značajne.

Tabela 11: Kruskal-Wallis H-test – rezultati (dužina rada u bankama)

Tvrdnje	Dužina rada	N	MR	z	p
Osećam se „emotivno istrošeno“ zbog svog posla	Od 1 do 5 godina	58	64,87	0,379	0,827
	Od 6 do 10 godina	24	65,92		
Osećam se iscrpljeno na kraju radnog dana	Preko 10 godina	53	72,37	2,803	0,246
	Od 1 do 5 godina	59	59,71		
Osećam se umorno čim se probudim ujutro jer je novi radni dan preda mnom	Od 6 do 10 godina	24	75,35	6,271	0,043*
	Preko 10 godina	53	75,18		
Osećam da „sagorevam“ zbog svog posla	Od 1 do 5 godina	59	61,11	0,866	0,648
	Od 6 do 10 godina	24	66,21		

	Preko 10 godina	53	77,76		
Osećam da „sagorevam” zbog svog posla	Od 1 do 5 godina	59	64,41	0,866	0,648
	Od 6 do 10 godina	24	72,81		
	Preko 10 godina	53	71,10		
Osećam se frustrirano zbog svog posla	Od 1 do 5 godina	59	62,44	2,226	0,329
	Od 6 do 10 godina	23	72,04		
	Preko 10 godina	53	73,64		
Imam osećaj da previše radim	Od 1 do 5 godina	59	59,68	6,110	0,047*
	Od 6 do 10 godina	23	76,57		
	Preko 10 godina	53	73,55		
Osećam se kao da nemam više dovoljno energije da se nosim sa izazovima ovog posla	Od 1 do 5 godina	59	62,86	0,520	0,771
	Od 6 do 10 godina	23	68,67		
	Preko 10 godina	53	73,42		

Izvor: Autori

Diskusija dobijenih rezultata

Rezultati sprovedenog istraživanja ukazuju da postoje razlike u osećaju emocionalne iscrpljenosti između muškaraca i žena. Osećaj emocionalne iscrpljenosti je zastupljeniji i učestaliji kod muškaraca, u poređenju sa ženama. Te razlike su najveće kod tvrdnje koja se odnosi na osećaj iscrpljenosti na kraju radnog dana – 46,81% muškaraca se oseća iscrpljeno na kraju radnog dana svaki dan, nekoliko puta nedeljno i jednom nedeljno, dok je to slučaj kod 39,24% žena. Isto tako, razlika je izražena i kod tvrdnje vezane za osećaj sagorevanja – 38,3% muškaraca ima učestali osećaj da „sagoreva” zbog svog posla, dok je to slučaj kod 32,58% žena. Ipak, rezultati dobijeni primenom Mann-Whitney U-testa nisu pokazali da su ove razlike između muškaraca i žena statistički značajne.

Dobijeni rezultati ukazuju da postoje razlike u osećaju emocionalne iscrpljenosti kod zaposlenih u zavisnosti od dužine radnog iskustva u bankama. Ispitanici koji rade duže od 10 godina u bankama su za većinu tvrdnji iskazali veću zastupljenost i učestalost osećaja emocionalne iscrpljenosti, osim za tvrdnju da imaju osećaj da previše rade. Rezultati su pokazali da tu prednjače ispitanici koji rade od 6 do 10 godina, odnosno više od polovine ispitanika (54,17%) koji rade od 6 do 10 godina u bankama imaju učestali osećaj da previše rade, dok je to slučaj kod skoro 40% (39,62%) ispitanika koji rade preko 10 godina. Ovaj rezultat nije iznenađujući imajući u vidu karijerne aspiracije zaposlenih i želju za napretkom, zbog čega često preuzimaju na sebe veći broj zadataka i aktivnosti u želji da se dokažu, što nije slučaj kod zaposlenih koji imaju veće iskustvo i specifično znanje, što po pravilo stižu tokom godina rada. Kruskal-Wallis H-test pokazao je da su razlike statistički značajne kod tvrdnji vezanih za osećaj umora i osećaj ispitanika da previše rade.

Na kraju, rezultati istraživanja pokazuju da ispitanici koji imaju kontakt sa klijentima na svom radnom mestu imaju zastupljeniji i učestaliji osećaj emocionalne iscrpljenosti. Ove razlike su posebno izražene kod tvrdnje koja se odnosi na osećaj iscrpljenosti na kraju radnog dana – 58,33% ispitanika koji imaju kontakt sa klijentima na svom radnom mestu imaju učestali osećaj iscrpljenosti na kraju radnog dana, u poređenju sa 32,95% ispitanika koji nemaju kontakt sa klijentima.

Takođe, 47,92% ispitanika koji imaju kontakt sa klijentima imaju učestali osećaj da previše rade, dok je to slučaj kod 34,09% ispitanika koji nemaju kontakt sa klijentima. Na kraju, 37,5% ispitanika koji imaju kontakt sa klijentima imaju učestali osećaj umora čim se probude jer su svesni da je novi radni dan pred njima, dok je to slučaj kod 24,99% ispitanika koji nemaju kontakt sa klijentima. Rezultati dobijeni primenom Mann-Whitney U-testa pokazali su postojanje statistički značajnih razlika kod ispitanika koji imaju kontakt sa klijentima i onih koji nemaju kod tvrdnji koje se odnose na osećaj iscrpljenosti na kraju radnog dana, osećaj sagorevanja i osećaj ispitanika da previše rade.

Zaključak

Emocionalna iscrpljenost zaposlenih postaje sve značajnija tema i predmet istraživanja. U ovom radu je ukazano na prisustvo emocionalne iscrpljenosti zaposlenih u bankarskom sektoru u Srbiji. Rezultati sprovedenog istraživanja u kojem je učestvovalo 136 zaposlenih u bankama u Srbiji pokazali su da postoji visok stepen učestalosti osećanja koja ukazuju da su ovi zaposleni emocionalno iscrpljeni. Rezultati su pokazali da je osećaj emocionalne iscrpljenosti nešto zastupljeniji i učestaliji kod zaposlenih koji rade duže od 10 godina u bankama i kod onih zaposlenih koji na svom radnom mestu imaju direktan kontakt sa klijentima.

Sprovedeno istraživanje pruža značajne informacije za menadžere i lidere jer im pruža uvid u to koliko je emocionalna iscrpljenost prisutna među zaposlenima u bankama. Poznajući ključne karakteristike i veću izloženost pojedinih grupa zaposlenih osećanjima emocionalne iscrpljenosti može da posluži menadžerima i liderima u procesu redizajniranja poslova i reorganizacije rada. Takođe, rezultati dobijeni ovim istraživanjem mogu da posluže i samim zaposlenima u bankarskom sektoru da bolje razumeju da nisu usamljeni u ovim osećanjima i da su pojedina radna mesta i uloge dodatno izloženi faktorima koji vode do iscrpljenosti.

Sprovedeno istraživanje prate i određena ograničenja. Pre svega, primenjeni upitnik je sadržao pitanja koja su zatvorenog tipa na koja su ispitanici označavali svoje odgovore, bez mogućnosti da dodatno pojašne ili opišu svoja osećanja ili njihove uzroke. Zatim, u istraživanju je učestvovalo samo 136 zaposlenih u bankama, te se dobijeni rezultati ne mogu generalizovati na ceo bankarski sistem. Takođe, istraživanje je sprovedeno samo u jednoj zemlji, te nije moguće porediti dobijene rezultate sa rezultatima u drugim zemljama zbog kulturoloških razlika.

Iz navedenih ograničenja slede preporuke za buduća istraživanja na ovu temu. U budućim istraživanjima bi trebalo uvesti pitanja otvorenog tipa na koja ispitanici mogu da upisuju svoje odgovore ili primeniti tehniku intervju za prikupljanje podataka. Na taj način bi se došlo do detaljnijih i dubljih saznanja o efektima i uzrocima iscrpljenosti zaposlenih u bankarskom sektoru. Takođe, istraživanjem bi trebalo obuhvatiti veći broj zaposlenih u bankama, ne samo u Srbiji, već i u drugim zemljama.

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EMOTIONAL EXHAUSTION OF EMPLOYEES IN BANKING SECTOR: EMPIRICAL RESULTS FROM SERBIA

Prof. Jelena Lukić Nikolić PhD

Professor, Modern Business School
jelena.lukic@mbs.edu.rs

Mr Vladimir Mirković

MEcon, Economists' Society, Belgrade
vladamirkovic@orion.rs

Summary: Emotional exhaustion has become a ubiquitous phenomenon in the banking sector. In this paper, empirical research was conducted using a specially designed questionnaire with the aim of assessing the emotional exhaustion of employees in the banking sector in Serbia in relation to their gender, length of work in the bank and contact with clients. During 2022, responses were collected from 136 respondents. In the data processing, non-parametric tests (Mann-Whitney U-test and Kruskal-Wallis H-test) were applied. The research results showed that the feeling of emotional exhaustion is more prevalent and frequent among men, compared to women, but that these differences are not statistically significant. Also, the research results indicated statistically significant differences in respondents' answers to the statements related to the feeling of tiredness and the feeling that they work too much, depending on the length of work in banks. Statistically significant differences exist in the answers of respondents who have contact with clients at their job and those who do not.

Keywords: banking sector, emotional exhaustion, burnout, stress, human resources, organizational behavior

JEL classification: I31, M54, J22, G21

Introduction

The term burnout was first used by the American psychologist and psychoanalyst Herbert Freudenberger in the 1970s to describe the way volunteers who worked with drug addicts became emotionally exhausted and demotivated over time. Burnout is a state of mental and physical exhaustion caused by professional life (Freudenberger, 1975). Nowadays, this syndrome is widely represented in the business environment. Employees in all jobs and positions are sometimes exposed to the burnout effect. Numerous studies have shown that the effect of employee burnout and exhaustion is particularly represented in the banking sector (Khalid et al., 2020; Tehrani et al., 2021; Tafi et al., 2022). Several key reasons were identified: pressure to achieve the best possible results, large amount of work, constant technological changes, strong competition, job insecurity (Koyuncu et al., 2021; Lubbadah, 2021; Awwad et al., 2022). The exhaustion of bank employees was especially manifested during the Covid-19 pandemic when most employees were faced with working from home where they did not have adequate working conditions (Lukić Nikolić & Mirković, 2023).

The aim of this paper is to examine the exhaustion of employees in the banking sector in Serbia. The first part of the paper is of a theoretical nature and includes the definition of exhaustion and the factors that cause it, as well as the key negative effects that occur among employees. The second part of the paper is devoted to the methodology of the conducted research, the presentation of research results and discussion of research findings.

Literature Review

Emotional exhaustion of employees is an undesirable phenomenon that has numerous negative effects not only on employees, but also on the entire company. According to the definition, emotional exhaustion is the exhaustion of employees due to high level of interpersonal demands. The frequent presence of emotional exhaustion can lead to the feeling that employees do not have control over their current situation and feel “trapped” in their work environment, without the ability to change and adapt to it (Cavanaugh et al., 2000). Emotional exhaustion is a mismatch between job demands and personal resources – it often happens that job demands are too high and personal resources are limited. Each individual can feel emotional exhaustion in different situations, at different times or work environments (Yang, 2023).

Employee exhaustion most often occurs because of excessive and complex work tasks, the need to be constantly available to superiors, colleagues or/and clients, pressure of deadlines or lack of knowledge and skills for assigned tasks and activities (Maslach et al., 2001). By reviewing the literature, certain phenomena can be singled out that can lead to employee burnout (Driskell et al., 2006; Grace Saunders, 2021):

Overload with work and different tasks - When employees have the optimal amount of work and tasks, they have the opportunity to carry out the assigned tasks in a quality way, without stress, to rest adequately, and to find time for further growth and development. In situations where employees are burdened with a large volume of work and tasks, they feel exhausted. In practice, numerous studies have shown that one of the key causes of employee exhaustion is overloading work tasks and activities that are extensive, urgent, and complex (Leiter & Maslach, 2005; Casserley & Megginson, 2009).

The pressure of deadlines - Employees often must complete tasks and realize goals within short deadlines, or they must find solutions to emerging problems that they have not faced before and that are new and unusual for them.

The pressure to achieve the best possible result, without errors and within the defined deadlines - Employees often feel pressure from managers and team leaders to achieve the best possible results, usually in short deadlines, which leads to stress, overwork, and feelings of exhaustion.

Additionally, some authors have observed that employee burnout can occur if the employee identifies too much with the job and when it disrupts the balance between work and private life (Moss, 2021). Employees sometimes have a desire to help everyone and to always be at the service to superiors and colleagues. Another source of employee exhaustion comes from intensive direct work with clients. In addition, personal characteristics of employees including gender, age, marital status can also influence the feeling of exhaustion and the effect of burnout (Ogresta et al., 2008).

Recently, it was considered that the effect of burnout among employees can also occur if the values and attitudes of the employees are not in accordance with the organizational values and attitudes (Maslach & Leiter, 2008).

Exhaustion can manifest as physical lethargy – the inability to get out of bed or the need and desire to lie down for the rest of the day after employees return from work. In the same way, exhaustion can manifest itself as a constant concern of employees (Casserley & Megginson, 2009). Emotional exhaustion of employees leads to stress and the effect of burnout, and therefore to numerous negative consequences, among them (Schaufeli & Enzmann, 1998):

- Constant feeling of mental, emotional and cognitive exhaustion;
- Anxiety, feeling of powerlessness, apathy, hopelessness;
- Sleep problems, insomnia, gastroenterological problems, appetite changes, headaches;
- Reduced productivity and work results;
- Reduced motivation and satisfaction;
- Turning employees with increased alcohol consumption.

In addition to the above, employees experience a loss of energy, enthusiasm, passion for work, a constant feeling of overload, exhaustion, and stress, as well as a loss of self-confidence and turning to negative attitudes and approaches towards everyone. Burnout has a negative impact on the quality of interpersonal relationships, but also on individual, team, and organizational results. The key consequences of burnout are an increase in absenteeism and turnover, a decrease in efficiency, productivity, motivation, and engagement of employees (Lazarević & Lukić Nikolić, 2024). Frequent statements of employees who are exhausted in their work environment refer to their frustration, then the inability to complete all tasks and activities, loss of enthusiasm and motivation, feelings of dissatisfaction and depression (Maslach & Leiter, 1997).

Research Methodology

The key research questions (RQs) posed in this paper are:

RQ 1: Are there differences in the feeling of emotional exhaustion between men and women?

RQ 2: Are there differences in the feeling of emotional exhaustion depending on the length of work in banks?

RQ 3: Are there differences in the feeling of emotional exhaustion between employees who have contact with clients and those who do not?

In this paper is conducted empirical research in which participated bank employees in Serbia. The data were collected during 2022 using a questionnaire that included several profile questions and a measurement scale "Emotional exhaustion of employees". The measurement scale included seven statements related to the emotional exhaustion of employees at the workplace. The respondents' possible answers were formulated in the form of a scale indicating frequency: every day, several times a week, once a week, several times a month, at least once a month, several times a year and never. A total of 136 respondents who work in banks in Serbia took part in the research.

The collected responses were processed using Microsoft® Excel® 2019 and Statistical Software for Social Sciences (SPSS), version 21. The Cronbach alpha coefficient for the measurement scale "Emotional exhaustion of employees" was 0.965, which indicates a high degree of reliability (DeVellis, 2003). The Kolmogorov Smirnov test showed a value of 0.186 with Sig.=0.000, which indicates that the assumption of normality of data distribution was not met. Consequently, data analysis used non-parametric statistical tests (Mann-Whitney U-test for comparing differences between two groups and Kruskal-Wallis H-test for comparison of differences between three groups of respondents). Levene's test determined the homogeneity of the variance ($p > 0.05$).

Research Results

Table 1 presents the respondents' answers to the profile questions. Almost two thirds of respondents are women (65.4%), while slightly more than one third of respondents are men (34.6%). The largest number of respondents who participated in this research had worked in the banking sector for up to 5 years (43.4%), followed by respondents who had worked for more than 10 years (39.0%). Slightly less than one fifth of the respondents had been working in the banking sector for 6 to 10 years (17.6%). In terms of contact with clients, almost two-thirds of respondents have had no contact with clients (64.7%), while slightly more than one third have had contact with clients (35.3%).

Table 1: Basic information about respondents

	N	%
Gender		
Male	47	34,6
Female	89	65,4
Years of working in banks		
Up to 5 years	59	43,4
From 6 to 10 years	24	17,6
More than 10 years	53	39,0

Contact with clients		
Have contact with clients	48	35,3
Without contact with clients	88	64,7

Source: Authors

The following tables (from Table 2 to Table 8) present the frequency and percentage of answers to statements within the measurement scale “Emotional exhaustion of employees”. The answers are shown in relation to the respondents’ gender, length of work in banks and whether the respondents have contact with clients.

Table 2: Respondents’ answers to the statement “I feel “emotionally drained” because of my job”

I feel “emotionally drained” because of my work														
	Male		Female		Up to 5 years of working		From 6 to 10 years of working		Above 10 years of working		Have contact with clients		Without contact with clients	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Every day	4	8.51	9	10.11	6	10.17	2	8.33	5	9.43	5	10.42	8	9.09
Several times a week	7	14.89	9	10.11	7	11.86	1	4.17	8	15.09	7	14.58	9	10.23
Once a week	4	8.51	8	8.99	4	6.78	3	12.50	5	9.43	5	10.42	7	7.95
Several times a month	7	14.89	14	15.73	8	13.56	6	25.00	7	13.21	6	12.50	15	17.05
At least once a month	4	8.51	15	16.85	6	10.17	2	8.33	11	20.75	6	12.50	13	14.77
Several times a year	17	36.17	26	29.21	21	35.59	8	33.33	14	26.42	13	27.08	30	34.09
Never	3	6.38	8	8.99	6	10.17	2	8.33	3	5.66	5	10.42	6	6.82
No answer	1	2.13	-	-	1	1.69	-	-	-	-	1	2.08	-	-
Total	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Source: Authors

About 30% (31.91%) of men often feel emotionally drained because of work (answers: every day, several times a week and once a week), while this is the case with 29.21% of women. More than 40% (43.38%) of respondents who have been working in banks for more than 10 years feel emotionally drained due to their work. They are followed by 28.81% of respondents who work for up to 5 years in banks who often feel emotional drain due to work, while this is the case with 25.0% of respondents who work from 6 to 10 years in banks. More than 35% (35.42%) of respondents who have contact with clients often feel emotionally drained due to work, while this is the case with 27.27% of respondents who do not have contact with clients.

Table 3: Respondents’ answers to the statement “I feel exhausted at the end of the work day”

I feel exhausted at the end of the work day														
	Male		Female		Up to 5 years of working		From 6 to 10 years of working		Above 10 years of working		Have contact with clients		Without contact with clients	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Every day	10	21.28	14	15.73	8	13.56	4	16.67	12	22.64	13	27.08	11	12.50
Several times a week	5	10.64	14	15.73	6	10.17	5	20.83	8	15.09	9	18.75	10	11.36

Once a week	7	14.89	7	7.78	6	10.17	3	12.50	5	9.43	6	12.50	8	9.09
Several times a month	6	12.77	19	21.35	11	18.64	4	16.67	10	18.87	6	12.50	19	21.59
At least once a month	10	21.28	19	21.35	11	18.64	6	25.00	12	22.64	5	10.42	24	27.27
Several times a year	8	17.02	15	16.85	15	25.42	2	8.33	6	11.32	8	16.67	15	17.05
Never	1	2.13	1	1.12	2	3.39	-	-	-	-	1	2.08	1	1.14
Total	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Source: Authors

Of the total number of men, almost 50% (46.81%) feel exhausted at the end of the working day, every day, several times a week, and once a week, while this is the case with almost 40% (39.24%) of women. The results show that half of employees who have worked in banks for over 10 years feel exhausted at the end of the working day every day, several times a week, and once a week, while this is the case with 47.16% of respondents who have worked for 6 to 10 years and 33.90% of those who have worked up to 5 years. Almost 60% (58.33%) of respondents who have contact with clients at their workplace have a frequent feeling of exhaustion at the end of the working day, compared to 32.95% of respondents who do not have contact with clients.

Table 4: Respondents' answers to the statement "I feel tired as soon as I wake up in the morning because the new work day is ahead of me"

I feel tired as soon as I wake up in the morning because the new work day is ahead of me														
	Male		Female		Up to 5 years of working		From 6 to 10 years of working		Above 10 years of working		Have contact with clients		Without contact with clients	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Every day	6	12.77	7	7.87	5	8.47	3	12.50	5	9.43	6	12.50	7	7.95
Several times a week	6	12.77	9	10.11	5	8.47	1	4.17	9	16.98	7	14.58	8	9.09
Once a week	3	6.38	9	10.11	4	6.78	3	12.50	5	9.43	5	10.42	7	7.95
Several times a month	7	14.89	12	13.48	6	10.17	2	8.33	11	20.75	7	14.58	12	13.64
At least once a month	6	12.77	16	17.98	9	15.25	4	16.67	9	16.98	5	10.42	17	19.32
Several times a year	14	29.79	26	29.21	22	37.29	9	37.50	9	16.98	12	25.00	28	31.82
Never	5	10.64	10	11.24	8	13.56	2	8.33	5	9.43	6	12.50	9	10.23
Total	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Source: Authors

Slightly more than 30% of men (31.92%) often feel tired as soon as they wake up in the morning because they are aware that a new working day is ahead of them, while this is the case with 28.09% of women. Out of the total number of respondents, 35.84% of them who have been working in banks for more than 10 years often feel tired because of the new working day is ahead of them, while this is the case with 29.17% of respondents who have been working for 6 to 10 years and 23.72% of respondents who have been working for up to 5 years. More than two thirds of respondents (375%) who have contact with clients have a frequent (every day, several times a week, once a week) feeling of tiredness as soon as they wake up because they are aware that a new working day is ahead of them, while this is the case with 24.99% respondents who do not have contact with clients.

Table 5: Respondents' answers to the statement "I feel that I am "burning out" because of my work"

I feel that I am "burning out" because of my work														
	Male		Female		Up to 5 years of working		From 6 to 10 years of working		Above 10 years of working		Have contact with clients		Without contact with clients	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Every day	8	17.02	9	10.11	10	16.95	3	12.50	4	7.55	10	20.83	7	7.95
Several times a week	6	12.77	16	17.98	5	8.47	4	16.67	13	24.53	8	16.67	14	15.91
Once a week	4	8.51	4	4.49	3	5.08	1	4.17	4	7.55	2	4.17	6	6.82
Several times a month	7	14.89	4	4.49	5	8.47	4	16.67	2	3.77	6	12.50	5	5.68
At least once a month	6	12.77	14	15.73	7	11.86	4	16.67	9	16.98	7	14.58	13	14.77
Several times a year	12	25.53	34	38.20	21	35.59	6	25.00	19	35.851	3	27.08	33	37.50
Never	4	8.51	8	8.99	8	13.56	2	8.33	2	3.77	2	4.17	10	11.36
Total	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Source: Authors

More than two thirds of men (38.3%) have a frequent feeling of "burning out" because of their work, while this is the case with 32.58% of women. A significantly higher number of men (14.89%) answered that they feel the burning sensation several times a month, compared to 4.49% of women. The largest number of respondents who often feel that they burn out because of work belong to the group of respondents who have worked in banks for over 10 years (39.63%), followed by respondents who have worked for 6 to 10 years (33.34%) and respondents who have worked for up to 5 years (30.5%). More than 40% (41.67%) of respondents who have contact with clients often feel that they burn out because of their work, compared to those respondents who do not have contact with clients (30.68%).

Table 6: Respondents' answers to the statement "I feel frustrated about my work"

I feel frustrated about my work														
	Male		Female		Up to 5 years of working		From 6 to 10 years of working		Above 10 years of working		Have contact with clients		Without contact with clients	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Every day	7	14.89	9	10.11	7	11.86	3	12.50	6	11.32	7	14.58	9	10.23
Several times a week	6	12.77	13	14.61	6	10.17	3	12.50	10	18.87	6	12.50	13	14.77
Once a week	4	8.51	6	6.74	2	3.39	4	16.67	4	7.55	6	12.50	4	4.55
Several times a month	4	8.51	7	7.87	5	8.47	1	4.17	5	9.43	5	10.42	6	6.82
At least once a month	2	4.26	6	6.74	4	6.78	-	-	4	7.55	2	4.17	6	6.82
Several times a year	13	27.66	27	30.34	17	28.81	9	37.50	14	26.42	12	25.00	28	31.82
Never	11	23.40	21	23.60	18	30.51	4	16.67	10	18.87	10	20.83	22	25.00
Total	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Source: Authors

Out of the total number of respondents, 36.17% of men often feel frustrated because of their work, while this is the case with 31.46% of women. Regarding the length of working experience in banks, the largest number of respondents (41.67%) who have been working for 6 to 10 years have a frequent feeling of frustration with their work. They are followed by those respondents who have worked for over 10 years (37.74%) and finally those respondents who have worked for up to 5 years in banks (25.42%). It should also be noted that 30.51% of respondents who have worked in banks for up to 5 years have never felt frustrated by their work. Over a third of respondents (34.58%) who have contact with clients have a frequent feeling of frustration because of their work, while this is the case with 29.55% of respondents who do not have contact with clients.

Table 7: Respondents' answers to the statement "I feel like I am working too much"

I feel like I am working too much														
	Male		Female		Up to 5 years of working		From 6 to 10 years of working		Above 10 years of working		Have contact with clients		Without contact with clients	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Every day	12	25.53	12	13.48	11	18.64	4	16.67	9	16.98	14	29.17	10	11.36
Several times a week	6	12.77	13	14.61	5	8.47	5	20.83	9	16.98	3	6.25	16	18.18
Once a week	3	6.38	7	7.87	3	5.08	4	16.67	3	5.66	6	12.50	4	4.55
Several times a month	2	4.26	9	10.11	2	3.39	1	4.17	8	15.09	5	10.42	6	6.82
At least once a month	10	21.28	15	16.85	10	16.95	4	16.67	11	20.75	7	14.58	18	20.45
Several times a year	12	25.53	25	28.09	22	37.29	3	12.50	12	22.64	9	18.75	28	31.82
Never	2	4.26	7	7.87	6	10.17	2	8.33	1	1.89	3	6.25	6	6.82
No answer	-	-	1	1.12	-	-	1	4.17	-	-	1	2.08	-	-
Total	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Source: Authors

Over 40% (44.68%) of men have a frequent feeling that they work too much at work, while this is the case with 35.96% of women. More than half of respondents (54.17%) who have been working for 6 to 10 years in banks have a frequent feeling that they work too much, while this is the case with almost 40% (39.62%) of respondents who have been working for more than 10 years. Furthermore, almost one third (32.19%) of respondents who have been working for up to 5 years have a frequent feeling that they are working too much. Almost half of respondents (47.92%) who have contact with clients have a frequent feeling that they work too much, while this is the case with 34.09% of respondents who do not have contact with clients.

Table 8: Respondents' answers to the statement "I feel like I do not have enough energy to cope with the challenges of this job anymore"

I feel like I do not have enough energy to cope with the challenges of this job anymore														
	Male		Female		Up to 5 years of working		From 6 to 10 years of working		Above 10 years of working		Have contact with clients		Without contact with clients	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Every day	6	12.77	5	5.62	4	6.78	2	8.33	5	9.43	5	10.42	6	6.82
Several times a week	5	10.64	9	10.11	5	8.47	-	-	9	16.98	6	12.50	8	9.09

Once a week	3	6.38	8	8.99	2	3.39	5	20.83	4	7.55	4	8.33	7	7.95
Several times a month	5	10.64	7	7.87	7	11.86	2	8.33	3	5.66	6	12.50	6	6.82
At least once a month	1	2.13	7	7.87	5	8.47	-	-	3	5.66	1	2.08	7	7.95
Several times a year	14	29.79	30	37.71	17	28.81	9	37.5	18	33.96	12	25.00	32	36.36
Never	13	27.66	22	24.72	19	32.20	5	20.83	11	20.75	13	27.08	22	25.00
No answer	-	-	1	1.12	-	-	1	4.17	-	-	1	2.08	-	-
Total	47	100	89	100	59	100	24	100	53	100	48	100	88	100

Source: Authors

Almost 30% (29.79%) of men have a frequent feeling that they do not have enough energy to cope with the challenges of their work, while this is the case with 24.72% of women. A little more than one third (33.96%) of respondents who have worked in banks for more than 10 years feel that they no longer have enough energy to cope with the challenges of their work, while this is the case with 29.16% of respondents who have worked for 6 to 10 years and 18.64% respondents who have worked for up to 5 years. Over 30% (31.25%) of respondents who have contact with clients have a frequent feeling that they lack the energy to cope with all challenges at work, while this is the case with 23.86% of respondents who do not have contact with clients.

In addition to frequency and percentage of responses, it is important to examine in more detail whether the differences in respondents' answers are statistically significant. For that reason, in further text are presented the results of the applied statistical tests.

Table 9 presents the results of the Mann-Whitney U-test in relation to the gender of the respondents. The obtained p values for each of the statements within the measurement scale did not show that the differences in the responses of men and women are statistically significant (p value ranges from 0.188 to 0.945).

Table 9: Results of Mann-Whitney U-test (gender of respondents)

Statements	Gender	N	MR	z	p
I feel "emotionally drained" because of my job	Male	46	68.32	-0.069	0.945
	Female	89	67.84		
I feel exhausted at the end of the work day	Male	47	69.81	-0.286	0.775
	Female	89	67.81		
I feel tired as soon as I wake up in the morning because the new work day is ahead of me	Male	47	70.82	-0.508	0.611
	Female	89	67.28		
I feel that I am "burning out" because of my work	Male	47	74.47	-1.317	0.188
	Female	89	65.35		
I feel frustrated about my work	Male	47	70.48	-0.435	0.663
	Female	89	67.46		
I feel like I am working too much	Male	47	73.33	-1.179	0.238
	Female	88	65.15		
I feel like I do not have enough energy to cope with the challenges of this job anymore	Male	47	69.63	-0.363	0.716
	Female	88	67.13		

Source: Authors

Table 10 presents the results of the Mann-Whitney U-test in relation to whether bank employees have direct contact with clients or do not have contact with them. The results show a statistically significant difference between respondents who have contact with clients and those who do not in three statements. These are the statements "I feel exhausted at the end of the working day" ($p=0.023$), then "I feel that I am "burning out" because of my work" ($p=0.018$) and "I feel that I am working too much" ($p=0.044$). The obtained results indicate that those respondents who have contact with clients are more often exposed to these negative feelings compared to respondents who do not have contact with clients.

Table 10: Results of Mann-Whitney U-test (contact with clients)

Statements	Contact	N	MR	z	p
I feel "emotionally drained" because of my job	No	88	66.86	-0.472	0.637
	Yes	47	70.13		
I feel exhausted at the end of the work day	No	88	62.91	-2.275	0.023*
	Yes	48	78.75		
I feel tired as soon as I wake up in the morning because the new work day is ahead of me	No	88	65.86	-1.076	0.282
	Yes	48	73.33		
I feel that I am "burning out" because of my work	No	88	62.76	-2.359	0.018*
	Yes	48	79.02		
I feel frustrated about my work	No	88	65.84	-1.092	0.275
	Yes	48	73.39		
I feel like I am working too much	No	88	63.13	-2.019	0.044*
	Yes	47	77.13		
I feel like I do not have enough energy to cope with the challenges of this job anymore	No	88	66.32	-0.701	0.483

Source: Authors

Table 11 presents the results of the Kruskal-Wallis H-test in relation to the length of work in banks. The results indicate that there are statistically significant differences between respondents depending on the length of work in banks for the two statements. These are the statements: "I feel tired as soon as I wake up in the morning because the new work day is ahead of me" ($p=0.043$) and "I feel like I am working too much" ($p=0.047$). The obtained results indicate that respondents who have been working for more than 10 years more often feel tired as soon as they wake up in the morning because a new working day is ahead of them compared to other respondents, while respondents who have been working for 6 to 10 years more often feel that they are working too much compared to other respondents and that these differences are statistically significant.

Table 11: Results of Kruskal-Wallis H-test (length of working in banks)

Statements	Length of working	N	MR	Chi-Square	p
I feel "emotionally drained" because of my job	Up to 5 years	58	64.87	0,379	0,827
	From 6 to 10 years	24	65.92		
	Above 10 years	53	72.37		
I feel exhausted at the end of the work day	Up to 5 years	59	59.71	2,803	0,246
	From 6 to 10 years	24	75.35		
	Above 10 years	53	75.18		
I feel tired as soon as I wake up in the morning because the new work day is ahead of me	Up to 5 years	59	61.11	6,271	0,043*
	Od 6 do 10 godina	24	66.21		

	Above 10 years	53	77.76		
I feel that I am "burning out" because of my work	Up to 5 years	59	64.41	0.866	0.648
	From 6 to 10 years	24	72.81		
	Above 10 years	53	71.10		
I feel frustrated about my work	Up to 5 years	59	62.44	2.226	0.329
	From 6 to 10 years	23	72.04		
	Above 10 years	53	73.64		
I feel like I am working too much	Up to 5 years	59	59.68	6.110	0.047*
	From 6 to 10 years	23	76.57		
	Above 10 years	53	73.55		
I feel like I do not have enough energy to cope with the challenges of this job anymore	Up to 5 years	59	62.86	0.520	0.771
	From 6 to 10 years	23	68.67		
	Above 10 years	53	73.42		

Source: Authors

Discussion of Research Findings

The results of the conducted research indicate that there are differences in the feeling of emotional exhaustion between men and women. The feeling of emotional exhaustion is more prevalent and frequent among men, compared to women. Those differences are the highest in the statement related to the feeling of exhaustion at the end of the working day - 46.81% of men feel exhausted at the end of the working day every day, several times a week and once a week, while this is the case with 39.24% of women. Likewise, this difference is high regarding the statement related to the feeling of burnout - 38.3% of men have a frequent feeling of "burning out" because of their work, while this is the case with 32.58% of women. However, the results obtained using the Mann-Whitney U-test did not show that these differences between men and women were statistically significant.

The obtained results indicate that there are differences in the feeling of emotional exhaustion among employees depending on the length of work experience in banks. Respondents who have been working in banks for more than 10 years expressed a higher prevalence and frequency of feelings of emotional exhaustion for most statements, except for the statement that they feel they are working too much. The results showed that the respondents who have worked in banks for 6 to 10 years are in the lead, that is, more than half of those respondents (54.17%) have a frequent feeling that they work too much, while this is the case with almost 40% (39.62 %) of respondents who have been working for over 10 years. This result is not surprising considering the career aspirations of the employees and the desire for career progress, which is why they often take on a greater number of tasks and activities in order to prove themselves. This is not the case with employees who have more experience and specific knowledge, which as a rule they acquire during years of work. The results of the Kruskal-Wallis H-test showed that the differences are statistically significant in the statements related to the feeling of tiredness and the respondents' feeling that they are working too much.

Finally, the research results show that respondents who have contact with clients at their workplace have a more prevalent and frequent feeling of emotional exhaustion. These differences are especially manifested in the statement related to the feeling of exhaustion at the end of the working day - 58.33% of respondents who have contact with clients at their workplace have a frequent feeling of exhaustion at the end of the working day, compared to 32.95% of respondents who do not have contact with clients. Also, 47.92% of respondents who have contact with clients have a frequent feeling that they work too much, while this is the case with 34.09% of respondents who do not have contact with clients. At the end, 37.5% of respondents who have contact with clients have a frequent feeling of being tired as soon as they wake up because they are aware that a new working day is ahead of them, while this is the case with 24.99% of respondents who do not have contact with clients. The results obtained by applying the Mann-Whitney U-test showed the existence of statistically significant differences between respondents who have contact with clients and those who do not in statements related to the feeling of exhaustion at the end of the working day, the feeling of burnout and the feeling of working too much.

Conclusion

Emotional exhaustion of employees is becoming an increasingly important topic and subject of research. This research presents the results regarding emotional exhaustion among employees in Serbia's banking sector. The results of the conducted research in which 136 bank employees in Serbia participated showed that there is a high degree of frequency of feelings that indicate that these employees are emotionally exhausted. The results showed that the feeling of emotional exhaustion is somewhat more prevalent and more frequent among employees who have been working for more than 10 years in banks and among those employees who have direct contact with clients.

The conducted research provides a significant basis for managers and leaders because it gives them an insight into how much emotional exhaustion is present among bank employees. Knowing the key characteristics and greater exposure of certain groups of employees to feelings of emotional exhaustion can help managers and leaders in the process of job redesign and reorganization. Also, the results obtained from this research can help the employees in the banking sector to better understand that they are not alone in these feelings and that certain workplaces and roles are additionally exposed to factors that lead to exhaustion.

The conducted research is accompanied by certain limitations. First of all, the applied questionnaire contained closed-ended questions to which respondents marked their answers, without the possibility to further explain or describe their feelings or their causes. Furthermore, only 136 bank employees participated in the research, so the obtained results cannot be generalized to the entire banking system. Finally, the research was conducted only in one country, so it is not possible to compare the obtained results with results in other countries due to cultural differences.

Recommendations for future research on this topic follow from the abovementioned limitations. In future research, open-ended questions should be introduced to which respondents can write their answers, or interview techniques should be used to collect data. In this way, more detailed and deeper knowledge would be obtained about the effects and causes of the exhaustion of employees in the banking sector. Furthermore, the research should include a larger number of bank employees, not only in Serbia, but also in other countries.

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UČINAK MERDŽERA I AKVIZICIJA NA PROFITABILNOST BANAKA

Snežana Colić

doktorand, istraživač pripravnik,
Ekonomski fakultet Univerziteta u Nišu
sneskaa992@gmail.com

Andreja Todorović

doktorand, istraživač saradnik,
Univerzitet u Nišu, Inovacioni centar
andrejatod@gmail.com

Žarko Radenović

doktorand, istraživač saradnik,
Univerzitet u Nišu, Inovacioni centar
z_radjenovic89@outlook.com

Apstrakt: Merdžeri i akvizicije kao strategije restrukturiranja banaka usmerenih na rast, u našem bankarskom sektoru prisutne su poslednje dve decenije. Najčešće su sprovedene u kriznim uslovima kada je stabilnost i profitabilnost pojedinih banaka bila ugrožena. Neminovan je uticaj ovih strategija restrukturiranja na performanse banaka, s obzirom na to da banke na taj način teže smanjenju troškova, povećanju profita, ekonomiji obima, pozicioniranju na tržištu, smanjenju konkurencije i zadovoljenju potreba klijenata. Kroz merdžere i akvizicije sprovedena je, donekle, i privatizacija banaka koje su deo tog procesa. Ovaj rad analizira uticaj merdžera i akvizicija kao strategija restrukturiranja na profitabilnost pojedinih banaka u bankarskom sektoru Republike Srbije. Rezultati analize na primeru AIK banke, OTP banke, Raiffeisen banke, banke Poštanska štedionica i NLB komercijalne banke za period od 2018. do 2022. godine, pokazuju da nakon aktivnosti spajanja ili preuzimanja osnovni pokazatelji profitabilnosti beleže rast, u odnosu na period pre sprovedenih merdžera i akvizicija. Međutim, profitabilnost pojedinačnih banaka i bankarskog sektora je pod uticajem i brojnih drugih faktora makroekonomske prirode.

Ključne reči: restrukturiranje banaka, merdžeri i akvizicije, profitabilnost bankarskog sektora Republike Srbije

JEL klasifikacija: G34, G21

Uvod

Deregulacija tržišta, zakonske promene i brojni drugi faktori na bankarskom finansijskom tržištu Srbije od 2000. god. pa do danas usloveli su promenu vlasničke strukture i koncentracije kapitala brojnih banaka. Na promene na finansijskom tržištu najviše je uticala globalna kriza 2008. godine. Period pre krize karakterisala je deregulacija tržišta, da bi nakon krize regulatorna tela težila većoj regulaciji. Regulacija tržišta, proces globalizacije i otvaranje tržišta za strane banke rezultiralo je stvaranju velikog broja merdžera u akvizicija u našem bankarskom sektoru.

Cilj ovog rada je da analizira proces restrukturiranja kroz merdžere i akvizicije i njihov uticaj na profitabilnost kao i značaj stabilnosti bankarskog sektora u savremenim uslovima privređivanja. Rad je baziran na prikupljanju i obradi kvantitativnih podataka relevantnih institucija i njihovu komparativnu analizu.

Restrukturiranje predstavlja proces koji obuhvata niz organizacionih, upravljačkih, vlasničkih, kadrovskih i tehnoloških promena, a fokus je ovde na analizi posledica restrukturiranja bankarskog sektora Republike Srbije. Često primenjivane strategije procesa restrukturiranja su merdžeri i akvizicije. Merdžer (spajanje) i akvizicija (pripajanje) najvažniji su faktor razvoja zemalja u tranziciji. Merdžer banaka odnosi se na vlasničku integraciju dve ili više banaka približno iste veličine, s ciljem da se poboljšaju postojeći uslovi poslovanja i poveća prosečna stopa prinosa. Akvizicija se, s druge strane odnosi na proces vlasničkog preuzimanja manje banke od strane finansijski veće i jače banke, s ciljem restrukturiranja dugova preuzete banke, a to u krajnjem vodi povećanju profita.

Nakon 2000. godine, u našem bankarskom sektoru pretežno su zastupljene banke u stranom vlasništvu. Period od 2000. do 2008. godine karakteriše porast bankarskih aktivnosti, da bi se do 2014. godine ispoljili negativni efekti pogrešnih odluka donetih u prethodnom periodu. Nakon 2014. godine pa sve do izbijanja krize na finansijskom tržištu izazvane pojavom pandemije virusa COVID-19, bankarski sektor Republike Srbije obeležen je konstantnim naporom da se odgovori na posledice krize i održi stabilnim svoje osnovne pokazatelje, likvidnost, profitabilnost i efikasnost.

Merdžeri i akvizicije u bankarskom sektoru Republike Srbije

Merdžeri i akvizicije u osnovi predstavljaju jedan od načina restrukturiranja kroz promenu vlasničke strukture, finansijske i organizacione strukture, kao i strukture kapitala. Smatra se da imaju veliki uticaj na performanse banaka i finansijski rezultat. Sprovode se kako bi se banka bolje pozicionirala na tržištu i prilagodila šansama u neposrednom okruženju.

Merdžer odnosno spajanje (engl. merger) podrazumeva spajanje dve ili više banaka u jednu. Pri tom, banke koje su deo procesa spajanja gube svoj prethodni identitet i nastavljaju da posluju u okviru nove banke, uglavnom pod novim imenom (Zelenović&Babić, 2018). Najčešće merdžer rezultira poboljšanju postojećih usluga, povećanju troškova zarada, povećanju prosečne stope prinosa po akciji zbog promene u strukturi kapitala (Kontić & Kontić, 2009). Na našem bankarskom tržištu kao primer merdžera navodi se spajanje NLB LHB banke Beograd i NLB Continental banka Novi Sad, koje od 2009. godine posluju pod nazivom NLB bank Beograd. Nova ljubljanska banka je izvršila i akviziciju 2005. godine kada je kupila većinske akcije novosadske Continental banke.

Akvizicija odnosno pripajanje (engl. acquisition) je aktivnost preuzimanja jedne ili više manjih banaka od strane veće i finansijski jače banke. Banka koja je sprovela preuzimanje nastavlja da posluje pod svojim dotadašnjim imenom, dok manja banka koja je preuzeta gubi svoj pravni identitet. Akvizicija se sprovodi s ciljem restrukturiranja dugovanja slabije banke, a to u krajnjem vodi povećanju profita. Tipičan primer akvizicije u bankarskom sektoru Republike Srbije je preuzimanje Niške banke, Kulske banke i Zepter banke od strane OTP banke. Takođe, Banka Poštanska štedionica preuzela je 2012. god. Novu Agrobanku, a 2013. god. preuzela je i Razvojnu banku Vojvodine i Privrednu banku Beograd.

Bankarska teorija i praksa poznaju tri modela merdžera i akvizicija: 1. Prvi model podrazumeva integraciju dve ili više manjih banaka u jednu; 2. Drugi model podrazumeva akviziciju manjih banaka od strane veće i jače banke; 3. Treći model odnosi se na merdžer ili akviziciju dve velike banke, pri čemu nova banka postaje svetska banka proširenjem svoje tržišne pozicije.

Istorijski posmatrano, merdžeri i akvizicije prisutne su na našem bankarskom tržištu još od 2000. godine. Globalizacija tržišta, deregulacija, tržišne promene, sve veći broj stranih banaka u bankarskom sektoru Srbije s početka 21. veka uslovio je brojne reforme koje su bile usmerene na konsolidaciju i restrukturiranje bankarskog sektora kroz ubrzani privredni rast.

Period globalne svetske krize od 2008. do 2014. god. uticao je u značajnoj meri na naše tržište. 2001. godine poslovalo je 86 banaka u bankarskom sektoru SRJ. Sprovođenjem merdžera i akvizicija, oduzimanjem dozvola za rad pojedinim bankama, greenfield investicijama ovaj broj je prepolovljen za period od godinu dana, da bi tokom 2005. godine država izgubila svoj udeo u Jubanci, Continental banci, Niškoj i Novosadskoj banci. Delta banku je kupila Banka Intesa, a 2006. god. Nacionalna banka Grčke kupila je Vojvođansku banku (Miković, 2022).

Oduzimanje dozvola za rad Poljoprivrednoj Agrobanci, Razvojnoj banci Vojvodine, Privrednoj banci Beograd i Univerzal banci broj banaka beleži dalji pad, da bi nakon toga od 2015. do 2019. god. došlo do stabilizacije i poboljšanja poslovnih performansi (Tabaković, 2020). U tabeli 1 prikazane su aktivnosti restrukturiranja banaka za period 2008-2021. god.

Tabela 1: Merdžeri i akvizicije u bankarskom sektoru Republike Srbije od 2008. do 2021. god.

Kupac	Target banka	Godina
*NLB Continental bank	*NLB LHB bank	2008
*Sberbank	*Volksbank	2012
*VTB bank	*Moskovska bank	2013
*Telenor bank	*LBC bank	
*Telekom Srbija	*Dunav bank	2015
*PE Advent; EBRD	*Addiko bank	
*Türkiye Halk Bankası	*Čačanska bank	
*Direktna bank	*Findomestic bank	2016
*Private investor	*KBM bank	
*Addiko bank	*Hypo Alpe-Adria bank	

*OTP *MK group *Expobank	*Vojvođanska bank *Alpha bank Serbia *Marfin bank	2017
*Direktna banka *Privatni investor	*Piraeus bank *VTB Banka	2018
*Država *PPF group *OTP *Alta bank	*Komercijalna bank *Telenor bank *Societe Generale Bank *Jubmes bank	2019
*Nova Ljubljanska banka *GLS Gemeinschaftsbank eG; Umweltbank AG; Triodos Investment Management B.V.	*Komemercial bank *Opportunity Bank JSC Novi Sad	2020
*Bank Poštanska štedionica *Raiffeisen Bank International AG *Eurobank Ergasias SA *AIK Bank a.d. Beograd, Gorenjska Banka d.d, Kranj, Agri Europe Cyprus Limited	*MTS bank *Credit Agricole bank of Serbia *Direct bank *Sberbank	2021

Izvor: autori na osnovu NBS (2022); Deloitte (2021); Miković (2022).

Od 2015. do 2021. god. sprovedeno je 18 transakcija restrukturiranja. Addiko banka, Čačanska banka, Hypo-Alpe Adria banka, Vojvođanska, Alpha banka, Komercijalna banka, Direktna, Sberbank, Societe Generali banka, Opportunity banka, kao neke od jačih banaka koje posluju na našem tržištu doživele su transformaciju vlasničke strukture u posmatranom periodu. Neke od ovih banaka bile su deo procesa restrukturiranja čak i više puta. Na primer, 2019. god. Srbija je nakon akvizicije Komercijalne banke stekla vlasništvo nad 83,23% udela. OTP banka je spajanjem sa Vojvođanskom bankom i Societe Generale bankom postala druga najveća banka na našem tržištu. NLB grupa je 2020. god. sprovela akviziciju Komercijalne banke i postala treća banka po veličini tržišnog udela u bankarskom sektoru Republike Srbije (NLB group, 2023). Iste godine, država Srbija stekla je većinski udeo u vlasništvu banke Poštanska štedionica. 2022. god. Sberbank Srbija preuzeta je od strane AIK banke, koja je nastavila sa poslovanjem pod imenom Naša AIK banka. Raiffeisen banka kupila je iste godine Credit Agricole banku, da bi 2023. god. Adriatic banka iz Podgorice preuzela beogradsku Expo banku.

Na osnovu podataka Narodne banke Srbije u 2023. god. u bankarskom sektoru Srbije posluje 20 banaka (NBS, 2023). One su uglavnom u privatnom vlasništvu sa izuzetkom Banke Poštanska štedionica gde država raspolaže sa 72,64% akcija i Srpskoj banci a.d. Beograd sa 76,69% udela (NBS, 2023).

Poslednjih godina nestabilnost na tržištu i brojna kretanja uzrokovana krizom globalnih razmera nakon pandemije COVID-19, uslovia su nestabilnost i na bankarskom tržištu. Negativni efekti krize bili su naročito prisutni u tranzitornim privredama. U skladu sa tim, bankarski sektor je bio izložen brojnim reformama i restrukturiranju, što pokazuju i rezultati istraživanja.

Efekti merdžera i akvizicija na profitabilnost banaka u Srbiji

Početak 21. veka na našem bankarskom tržištu označio je i početak restrukturiranja bankarskog sektora. Restrukturiranje se u Republici Srbiji prvenstveno manifestovalo kroz ulazak stranih banaka, odnosno povećanje otvorenosti bankarskog tržišta. Čitav proces vodio je privatizaciji, odnosno smanjenu državnog vlasništva i smanjenju odgovornosti države za eventualne gubitke pojedinih banaka. Kupoprodaja banaka i preuzimanje kapitala i obaveza drugih banaka uslovljena je brojnim motivima. Najčešće se među najznačajnijima navode (Zelenović & Babić, 2018): smanjenje rizika, povećanje profita, smanjenje troškova, smanjenje konkurencije, povećanje efikasnosti, poresko i tržišno pozicioniranje, zadovoljenje potreba klijenata, pristup tehnologiji i sposobniji menadžment. Banke na lokalnom tržištu teže ostvarenju ekonomije obima, dok međudržavni merdžeri i akvizicije imaju za cilj formiranje većih međunarodnih banaka koje imaju finansijski značaj na globalnom tržištu.

Bez obzira na motive i ciljeve merdžera i akvizicija, neminovan je njihov uticaj na performanse banaka. Merdžeri i akvizicije imaju uticaj na kapital, štednju, likvidnost, profitabilnost, ali i na troškove poslovanja, kao najznačajnije pokazatelje uspešnosti poslovanja. Ovaj deo rada bavi se analizom uticaja merdžera i akvizicija na profitabilnost pojedinih banaka bankarskog sektora Republike Srbije, koje su bile deo ovog procesa i koje imaju značajnije tržišno učešće.

Profitabilnost banaka u Srbiji određena je brojnim faktorima među kojima se kao najznačajniji navode (Čurić, 2018): veličina banke, vlasništvo, diversifikacija prihoda, izloženost kamatnom, kreditnom i riziku likvidnosti, kapital, efikasnost poslovanja i produktivnost rada. Makroekonomski faktori koji mogu da utiču na profitabilnost banaka i bankarskog sektora odnose se na stopu inflacije, nivo bruto domaćeg proizvoda, fazu ekonomskog ciklusa u kojoj se konkretna zemlja nalazi, regulatorne mehanizme privrede i razvijenost finansijskog sistema. Za potrebe ovog rada, pažnja je posvećena, posredno, analizi veličine banke i njenog uticaja na profitabilnost, s obzirom na to da se veličina banke menja pod uticajem merdžera i akvizicija. Zbog dostupnosti informacija i načina izveštavanja istraživanje je bazirano na analizi pokazatelja profitabilnosti za period od 2018. do 2022. god. Predstavljani su pokazatelji profitabilnosti za Raiffeisen banku, AIK banku, banku Poštanska štedionica, NLB komercijalnu i za OTP banku.

Uticaj merdžera i akvizicija na profitabilnost AIK banke a.d. Beograd

AIK banka je preuzimanje Sberbanke ad Beograd započela 2021. godine. Na osnovu podataka iz tabele 2 možemo zaključiti da osnovni pokazatelji profitabilnosti Prinos na aktivu (engl. Return on assets - ROA) i Prinos na kapital (engl. Return on equity - ROE) beleže rast od 2018. do 2020. god.

$$ROA = \frac{\text{Neto prihod}}{\text{Prosečna ukupna aktiva}}$$

$$ROE = \frac{\text{Neto prihod}}{\text{Prosečni ukupni kapital}}$$

Pored ovih pokazatelja u okviru profitabilnosti analizirana je i Neto kamatna marža (engl. Neto interest margin NIM).

$$NIM = \frac{\text{Kamatni prihodi} - \text{Kamatni rashodi}}{\text{Ukupna Aktiva}}$$

Tabela 2: Indikatori profitabilnosti AIK banke za period 2018-2022. god. prikazani u %

	2018	2019	2020	2021	2022
ROA	3,2	4,4	4,7	2,8	2,6
ROE	10,8	16,7	19,7	12	8,6
NIM	3,6	3,1	2,9	2,6	2,6

Izvor: autori na osnovu konsolidovanih finansijskih izveštaja AIK banke (2023).

Posledice globalne finansijske krize izazvane pandemijom COVID-19, nestabilnost na globalnom finansijskom tržištu uticala je i na poslovanje banaka u našoj zemlji. 2021. god. zabeležen je pad profitabilnosti AIK banke. Usporavanje privredne aktivnosti usled globalne krize, ali i nestabilnosti na tržištu Evrope kao posledica izbijanja rata između Rusije i Ukrajine, zahtevaju dokapitalizaciju banaka. Da bi banke održale likvidnost na regulatornom nivou ne mogu uvek trošiti sredstva iz kapitala za zaštitu od rizika, jer će ga vremenom istrošiti do mere da pokazatelj adekvatnosti kapitala padne ispod minimalnih 12%. Shodno tome, bankama je neophodna dokapitalizacija, kako bi održale likvidnost na zahtevanom nivou. Međutim, dokapitalizacijom banke urušavaju svoju profitabilnost zbog uvećanog kapitala, ali i većih troškova rezervacija i manjeg profita (ili čak i gubitka), što se jasno očitava kroz formulu za ROE. ROA beleži porast od 2018. do 2020. godine, dok u godini restrukturiranja i nakon toga beleži pad.

Pad pokazatelja profitabilnosti AIK banke u 2021. i 2022. god. posledica je globalne finansijske krize i tržišnih kretanja. Tokom 2021. god. porast operativnih rashoda u ukupnom iznosu od 4 mlrd dinara u odnosu na 2020. god. posledica je porasta troškova u oblasti intelektualnih usluga i troškova obavljanja poslovnih aktivnosti zbog procesa digitalizacije i širenja poslovanja. Porast troškova prati i smanjenje prihoda u istom procentu. Kretanje tržišnih kamatnih stopa i porast referentne kamatne stope uslovili su pad prihoda AIK banke. Pokazatelji adekvatnosti kapitala beleže pad sa 22,29% 2020. god. na 20,37% 2021. god., a 2022. god. ovaj pokazatelj je iznosio 19,81% (AIK banka, 2023). Cilj banke je da pokazatelj adekvatnosti kapitala održi u skladu sa zahtevima NBS. Pored ovih pokazatelja na profitabilnost i stabilnost banke utiče i nivo problematičnih kredita koji je 2021. god. bio u porastu u odnosu na prethodne godine. Učešće nenaplativih kredita u ukupnim kreditima 2020. god. bilo je 3,32%, dok je 2021. god. ovaj procenat bio na nivou od 4,21% (AIK banka, 2023). Najveći udeo u nenaplativim kreditima imaju krediti privrednih društava. Tokom godina pandemije i nakon toga najveći broj aktivnosti usmeren je na praćenje, kontrolu i procenu rizika u cilju profitabilnog poslovanja.

Uticao merdžera i akvizicija na profitabilnost Raiffeisen banke a.d. Beograd

Pokazatelji profitabilnosti Raiffeisen banke tokom 2020. god. beleže pad. Smatra se da je pad profitabilnosti banaka uslovljen lošim tržišnim ambijentom, smanjenjem profita banaka usled rasta referentnih kamatnih stopa za koje su vezane kamatne stope naših banaka. 2020. godine, NBS je uvela moratorijum na kredite banaka usled globalne finansijske krize, visoke iznose rezervacija, što je uticalo na pad profitabilnosti. 2022. god. završeno je preuzimanje Credit Agricole banke od strane Raiffeisen banke, pa je donekle i to rezultiralo povećanju profitabilnosti.

Tabela 3: Indikatori profitabilnosti Raiffeisen banke za period 2018-2022. prikazani u %

	2018	2019	2020	2021	2022
ROA	2,6	2,1	1,6	1,8	2,1
ROE	12,3	11,2	9,5	12,2	16,8
NIM	3,4	3,1	2,2	2,6	2,6

Izvor: autori na osnovu konsolidovanih finansijskih izveštaja Raiffeisen banke (2023)

Povećanju pokazatelja profitabilnosti doprinosi u najvećoj meri rast kreditne aktivnosti i rešavanje problematičnih kredita. Racio problematičnih kredita smanjen je za 2,8% u 2022. god. Takođe, kretanje tržišnih kamatnih stopa uslovalo je rast prihoda od kamata za 21.5% u odnosu na 2021. god. Trend kretanja operativnih troškova odnosi se na njihov sporiji rast u odnosu na rast prihoda, što utiče na to da operativni rezultat poslovanja banke tokom 2022. god. zabeleži porast od 37,7%. Pokazatelj adekvatnosti kapitala od 21,7% znatno je iznad propisanog minimuma. Možemo zaključiti da promena vlasništva i moguća pojava rizika kod klijenata nije ugrozila osnovne pokazatelje profitabilnog i stabilnog poslovanja Raiffeisen banke.

Uticaj merdžera i akvizicija na profitabilnost OTP banke Srbije a.d. Beograd

OTP banka je 2007. godine prvo preuzela Nišku, Kulsku i Zepter banku. Zatim, 2017. god. preuzela je Vojvođansku banku, da bi 2019. god. kupila Societe Generale banku. U tabeli 4, pokazatelji profitabilnosti prikazani su od 2020. godine, zbog nedostupnosti podataka i finansijskih izveštaja pre izvršene integracije. OTP bankarska grupa 2020. godine ostvarila je pad profitabilnosti, a pokazatelji ROA i ROE imaju negativan predznak. Smanjenje profitabilnosti objašnjava se drastičnim padom poslovnih prihoda, za 5,8% u odnosu na 2019. godinu. Analitičari ističu da je pad poslovnih prihoda posledica smanjenja neto prihoda od naknada i provizija, za 10,2%, uglavnom kao rezultat snažnog efekta pandemije i vanrednog stanja tokom drugog kvartala 2020. godine. Takođe, neto prihod po osnovu kamata od 11,5 milijardi dinara, bio je na nešto nižem nivou u odnosu na 2019. godinu za -1,9% (-217 milion dinara) uglavnom kao posledica pada prihoda od kamata. Nakon toga osnovni pokazatelji profitabilnosti beleže porast uz zadovoljavajući nivo kapitala, smanjenje troškova i smanjenje procenta nenaplativih kredita.

Tabela 4: Indikatori profitabilnosti OTP banke za period 2018-2022. prikazani u %

	2018	2019	2020	2021	2022
ROA			-0,06	1,17	1,51
ROE			-0,42	8,84	11,34
NIM			3,10	2,40	3,02

Izvor: autori na osnovu konsolidovanih finansijskih izveštaja OTP banke (2023)

Kao rezultat uspešno sprovedene najkompleksnije integracije u regionu u jeku pandemije, odličnih poslovnih rezultata uz rastuću profitabilnost, operativnu efikasnost i zdrav rast portfolija kredita, OTP banka se izdvojila kao lider na bankarskom tržištu (OTP banka, 2023). Nakon okončane integracije, banka je uspela da zadrži i poboljša tokom 2021. i 2022. godine poziciju najvećeg kreditora privrede i stanovništva, kao i lidera na tržištu faktoring, lizing i e-commerce usluga.

Uticaj merdžera i akvizicija na profitabilnost banke Poštanska štedionica a.d. Beograd

Banka Poštanska štedionica sprovela je integraciju sa MTS bankom 2021. god. Nakon merdžera, Republika Srbija stekla je vlasništvo nad 70,5% akcija Poštanske štedionice. Po veličini bilansne sume banka spada u red manjih banaka.

Tabela 5: Indikatori profitabilnosti Poštanske štedionice za period 2018-2022. prikazani u %

	2018	2019	2020	2021	2022
ROA	1,4	1,3	1,0	0,7	1,0
ROE	12,7	12,5	10,1	7,9	13,7
NIM	5,2	5,1	4,40	4,0	4,0

Izvor: autori na osnovu konsolidovanih finansijskih izveštaja banke Poštanska štedionica (2023)

Kao i ostale banke u bankarskom sektoru RS, i banka Poštanska štedionica je do 2021. god. imala pad profitabilnosti, što zbog politike poslovanja, smanjenih prihoda, što zbog turbulentnih tržišnih uslova. Nakon preuzimanja MTS banke i stabilizacije poslovanja, neto kamatna marža je stabilnija, a profitabilnost banke beleži neznatan porast. Povećanje profitabilnosti rezultat je i povećanje kreditne aktivnosti i efikasnosti poslovanja, smanjenja racia nenaplativih kredita i povećanje stope adekvatnosti kapitala. Nivo nenaplativih kredita na kraju 2022. god iznosio je 3,07% što je ispod nivoa ovog racia bankarskog sektora RS (3,5%), dok je racio adekvatnosti kapitala na kraju 2022. iznosio 24,3% (Banka Poštanska štedionica, 2023).

Uticaj merdžera i akvizicija na profitabilnost NLB Komercijalne banka a.d. Beograd

Značajan uticaj na poslovanje svih banaka u bankarskom sektoru Republike Srbije imala je pandemija COVID-19. Kada je reč o NLB Komercijalnoj banci drastičan pad profitabilnosti zabeležen je 2020. god. usled pada poslovnih prihoda od 33% u odnosu na 2019. god. i rast troškova rezervisanja i ispravki vrednosti od 48% u odnosu na prethodnu godinu. U tabeli 6 dat je pregled osnovnih pokazatelja profitabilnosti NLB Komercijalne banke.

Tabela 6: Indikatori profitabilnosti NLB Komercijalne banke za period 2018-2022. prikazani u %

	2018	2019	2020	2021	2022
ROA	2,0	1,7	0,8	0,6	1,5
ROE	12,1	10,2	4,9	3,6	10,8
NIM	3,3	3,0	2,7	2,7	3,1

Izvor: autori na osnovu konsolidovanih finansijskih izveštaja NLB Komercijalne banke (2023)

Na osnovu analiziranih podataka možemo zaključiti da do 2020. god. i sprovedene akvizicije Komercijalne banke, profitabilnost NLB banke je bila u padu. U 2022. god. porast profitabilnosti objašnjava se rastom neto prihoda od kamata (za 9,4% u odnosu na 2021. god) i naknada (za 16,65% u odnosu na 2021. god).

Konsolidacija srpskog bankarskog tržišta nastavljena je tokom 2022. god., tako da je nakon spajanja Komercijalne banke i NLB banke broj banaka u bankarskom sektoru RS bio 21. Kao rezultat novih spajanja i prethodnog koje se desilo proteklih godina, pet banaka zadržava 70,8% aktive bankarskog sektora. Koncentracija bankarskog sektora bila je iznudaena neophodnošću digitalizacije bankarskih proizvoda i nemogućnošću manjih banaka da podrže proces inovacija.

Zaključak

Ovo istraživanje razmatra merđžere i akviziciju kao strategiju usmerenu na rast i njihov uticaj na profitabilnost određenih banaka u Republici Srbiji. Talas merđžera i akvizicija bio je posebno izražen tokom svetske krize 2008. godine, da bi se to ponovilo i od 2020. godine sa pandemijom virusa COVID-19 i rata između Ukrajine i Rusije, što je izazvalo još jednu krizu globalnih razmera. Fokus ovog rada bio je na analizi osnovnih pokazatelja profitabilnosti pojedinih banaka u Republici Srbiji, među kojima su AIK banka, OTP banka, Raiffeisen banka, banka Poštanska štedionica i NLB Komercijalna banka. Opšti zaključak je da smanjenje troškova poslovanja i povećanje prihoda, smanjenje koeficijenta problematičnih kredita i povećanje nivoa adekvatnosti kapitala, kao i povećanje veličine banke utiče na povećanje osnovnih pokazatelja profitabilnosti.

Rezultati analize pokazatelja AIK banke pokazuju da je AIK banka imala rastuću profitabilnost merenu pokazateljima ROA i ROE u periodu 2018-2020. god, da bi tokom 2021. god. vrednost ovih pokazatelja naglo pala i taj trend je nastavljen do kraja posmatranog perioda. Istovremeno, NIM beleži konstantni pad tokom posmatranog perioda. Raspoloživi podaci iz izveštaja ove banke nisu dovoljni da bismo zaključili da li bi pad vrednosti osnovnih pokazatelja profitabilnosti bio veći da AIK banka nije sprovedla preuzimanje Sberbanke.

Analizom pokazatelja profitabilnosti Raiffeisen banke zaključujemo da postoji kontinuirani pad ovih pokazatelja, da bi nakon preuzimanja Credit Agricole banke osnovni pokazatelji zabeležili rast u odnosu na godine pre preuzimanja. Rast vrednosti pokazatelja s jedne strane, rezultat je sprovedenog preuzimanja, što je u skladu sa zaključcima brojnih autora, dok sa druge strane može biti i rezultat brojnih aktivnosti regulatornih organa za oporavak privrede nakon pandemije. Međutim, podaci na osnovu kojih je sprovedeno istraživanje nisu dovoljni da bi izveo zaključak o učinku ovih činoca na profitabilnost konkretne banke.

Najveći pad profitabilnost u posmatranom periodu imala je OTP banka, na šta ukazuju i pokazatelji ROA i ROE koji imaju negativan predznak u 2020. godini. S obzirom na to da pre izvršenih poslovnih aktivnosti finansijski izveštaji nisu dostupni, raspoloživi podaci nisu dovoljni za validan zaključak. Pretpostavlja se da je rast profitabilnosti u 2022. godini rezultat oporavka privrede i ekonomije nakon pandemije.

Kada je reč o banci Poštanska štedionica, kao jednoj od manjih banaka u našem bankarskom sektoru, vidimo da pokazatelji ROA, ROE i NIM beleže kontinuiran pad od 2018. do 2021. god. Nakon preuzimanja MTS banke od strane Poštanske štedionice došlo je do rasta ovih pokazatelja u 2022. god. Otvoreno je pitanje i može biti predmet budućih istraživanja, da li je stabilizacija i rast profitabilnosti banke rezultat sprovedenog preuzimanja ili poboljšanja opšteg stanja na bankarskom finansijskom tržištu.

Profitabilnost NLB Komercijalne banke merena ROA, ROE i NIM bila je u padu u periodu 2018-2021. god. Nefitabilno poslovanje Komercijalne banke uslovalo je sprovođenje akvizicije od strane NLB banke. Nakon ovih poslovnih aktivnosti NLB Komercijalna banka u 2022. godini ima rastuću profitabilnost. Međutim, podaci iz izveštaja nisu dovoljni da sa sigurnošću možemo tvrditi da je rastuća profitabilnost rezultat sprovedene akvizicije.

Razultati ovog istraživanja pokazuju da na primeru pojedinačnih banaka u bankarskom sektoru Republike Srbije, sprovedene aktivnosti merđžera i akvizicija na kratak rok nisu dovele do poboljšanja uspešnosti poslovanja, što pokazuju i osnovni indikatori profitabilnosti. Postoji mogućnost da su ove aktivnosti dovele do povećanja profitabilnosti i stabilnosti poslovanja banaka koje su bile deo procesa restrukturiranja, ali to može biti predmet budućih istraživanja.

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THE EFFECT OF MERGERS AND ACQUISITIONS ON THE BANKS' PROFITABILITY

Snežana ColićPhD student, Faculty of Economics,
University of Niš
sneskaa992@gmail.com**Andreja Todorović**PhD student, Innovation Centre of the University of Niš
andrejatod@gmail.com**Žarko Rađenović**PhD student, Innovation Centre of the University of Niš
z_radjenovic89@outlook.com

Abstract: Mergers and acquisitions, as strategies for restructuring banks aimed at growth, have been present in our banking sector for the last two decades. Most often, they were implemented in crisis conditions when the stability and profitability of certain banks were threatened. The influence of these restructuring strategies on the performance of banks is inevitable, given that banks thus strive to reduce costs, increase profits, economies of scale, market positioning, reduce competition, and satisfy the needs of clients. Through mergers and acquisitions, the privatization of banks that are part of that process was carried out to some extent. This paper analyzes the impact of mergers and acquisitions as a restructuring strategy on the profitability of individual banks in the banking sector of the Republic of Serbia. The results of the analysis on the example of AIK Bank, OTP Bank, Raiffeisen Bank, Postal Saving Bank, and NLB Komercijalna Bank for the period from 2018 to 2022 show that, after merger or takeover activities, the basic indicators of profitability recorded an increase compared to the period before the mergers and acquisition were implemented. However, the profitability of individual banks and the banking sector is influenced by numerous other macroeconomic factors.

Keywords: bank restructuring; mergers and acquisitions; profitability of banks in the Republic of Serbia

JEL classification: G34, G21

Introduction

The deregulation of the market, legislative changes, and numerous other factors in the Serbian banking financial market from 2000 to the present have led to a change in the ownership structure and capital concentration of numerous banks. The most significant impact on changes in the financial market was the global crisis of 2008. The period before it was characterized by market deregulation, while after the crisis, regulatory bodies aimed for greater regulation. Regulation of the financial market, the process of globalization, and the opening of the market to foreign banks have resulted in the creation of a large number of mergers and acquisitions in our banking sector.

This paper aims to analyze the restructuring process through mergers and acquisitions and their impact on profitability, as well as the importance of stability in the banking sector under modern economic conditions. The study is based on gathering and processing quantitative data from relevant institutions and conducting a comparative analysis.

Restructuring is a process that includes a series of organizational, management, ownership, personnel, and technological changes, and the focus here is on the analysis of the consequences of the restructuring of the banking sector of the Republic of Serbia. Often applied restructuring process strategies are mergers and acquisitions. Mergers and acquisitions are the most important factors in the development of countries in transition. A bank merger refers to the ownership integration of two or more banks of approximately the same size, to improve existing business conditions and increase the average rate of return. Acquisition, on the other hand, refers to the process of ownership takeover of a smaller bank by a financially larger and stronger bank, to restructure the debts of the acquired bank, and ultimately increase profits.

After 2000, our banking sector was dominated by foreign-owned banks. The period from 2000 to 2008 was characterized by an increase in banking activities, so that the negative effects of wrong decisions made in the previous period would have manifested by 2014. After 2014 and until the outbreak of the financial market crisis caused by the outbreak of the COVID-19 virus pandemic, the banking sector of the Republic of Serbia was marked by a constant effort to respond to the consequences of the crisis and maintain its basic indicators, liquidity, profitability, and efficiency.

Mergers and Acquisitions in the Banking Sector of the Republic of Serbia

Mergers and acquisitions are ways of restructuring through changing the ownership structure, financial and organizational structure, as well as the capital structure. They are considered to have a major impact on the banks' performance and financial results. Mergers and acquisitions are carried out to better position the bank in the market and adapt to opportunities in the immediate environment.

A merger is defined as merging two or more banks into one. At the same time, banks that are part of the merger process lose their previous identity and continue to operate within the new bank, mostly under a new name (Zelenović & Babić, 2018). Most often, a merger results in the improvement of existing services, an increase in labor costs, and an increase in the average rate of return per share due to a change in the capital structure (Kontić & Kontić, 2009).

An example of a merger in our banking market is the merger of NLB LHB Bank Beograd and NLB Continental Bank Novi Sad, which have been operating under the name NLB Bank Beograd since 2009. Nova Ljubljanska Bank was acquired in 2005 when it bought the majority shares of Novi Sad Continental Bank.

Acquisition is the takeover of one or more smaller banks by a larger and financially stronger bank. The bank that carried out the takeover continues to operate under its previous name, while the smaller bank that was taken over loses its legal identity. The acquisition is being carried out to restructure the debt of a weaker bank, and ultimately increase profits. A typical example of an acquisition in the banking sector of the Republic of Serbia is the takeover of Niška Bank, Kulska Bank, and Zepter Bank by OTP Bank. Also, in 2012, Postal Savings Bank took over New Agrobank, and in 2013 it also took over the Development Bank of Vojvodina and Privredna Bank Beograd.

Banking theory and practice identify three models of mergers and acquisitions: 1. The first model involves the integration of two or more smaller banks into one; 2. The second model involves the acquisition of smaller banks by a larger and stronger bank; 3. The third model refers to the merger or acquisition of two large banks, whereby the new bank becomes a world bank by expanding its market position.

Historically speaking, mergers and acquisitions have been present in our banking market since 2000. Globalization of the market, deregulation, market changes, and the growing number of foreign banks in the banking sector of Serbia from the beginning of the 21st century led to numerous reforms aimed at consolidation and restructuring of the banking sector through accelerated economic growth.

The period of the global world crisis from 2008 to 2014 has had a significant impact on our market. In 2001, 86 banks operated in the banking sector of the FRY. Through the implementation of mergers and acquisitions, the withdrawal of operating licenses from certain banks, and Greenfield investments, this number was halved in one year, so that during 2005, the state lost its share in Jubanka, Continental bank, Niška, and Novosadska bank. Delta Bank was bought by Banca Intesa, and in 2006 the National Bank of Greece bought Vojvođanska Bank (Miković, 2022).

The withdrawal of operating licenses from the Agricultural Bank, the Development Bank of Vojvodina, the Privredna Bank Beograd, and the Universal Bank furthered the decline in the number of banks, after which a period of stabilization and improvement of business performance would follow from 2015 to 2019 (Tabaković, 2020). Table 1 shows bank restructuring activities for the period 2008-2021.

Table 1: Mergers and Acquisitions in the Banking Sector

Customer	Target bank	Year
*NLB Continental bank	*NLB LHB bank	2008
*Sberbank	*Volksbank	2012
*VTB bank	*Moskovska bank	2013
*Telenor bank	*LBC bank	
*Telekom Srbija	*Dunav bank	2015
*PE Advent; EBRD	*Addiko bank	
*Türkiye Halk Bankası	*Čačanska bank	
*Direktna bank	*Findomestic bank	2016
*Private investor	*KBM bank	
*Addiko bank	*Hypo Alpe-Adria bank	

*OTP *MK group *Expobank	*Vojvođanska bank *Alpha bank Serbia *Marfin bank	2017
*Direktna banka *Privatni investor	*Piraeus bank *VTB Banka	2018
*Država *PPF group *OTP *Alta bank	*Komercijalna bank *Telenor bank *Societe Generale Bank *Jubmes bank	2019
*Nova Ljubljanska banka *GLS Gemeinschaftsbank eG; Umweltbank AG; Triodos Investment Management B.V.	*Komemercial bank *Opportunity Bank JSC Novi Sad	2020
*Bank Poštanska Štedionica *Raiffeisen Bank International AG *Eurobank Ergasias SA *AIK Bank a.d. Beograd, Gorenjska Banka d.d, Kranj, Agri Europe Cyprus Limited	*MTS bank *Credit Agricole bank of Serbia *Direct bank *Sberbank	2021

Source: authors based on NBS (2022); Deloitte (2021); Miković (2022).

From 2015 to 2021, 18 restructuring transactions were carried out. Addiko Bank Čačanska Bank, Hypo-Alpe Adria Bank, Vojvođanska, Alpha Bank, Komercijalna Bank, Direktna, Sberbank, Societe Generale Bank, Opportunity Bank as some of the stronger banks operating on our market experienced a transformation of the ownership structure in the observed period. Some of these banks have even been part of the restructuring process more than once. For example, in 2019 after the acquisition of Komercijalna Bank, Serbia acquired ownership of 83.23% of the shares. By merging with Vojvođanska Bank and Societe Generale Bank, OTP Bank became the second largest bank in our market. In 2020, the NLB Group carried out the acquisition of Komercijalna Bank and became the third bank in terms of market share in the banking sector of the Republic of Serbia (NLB Group, 2023). In the same year, the State of Serbia acquired a majority share in the ownership of Postal Savings Bank. In 2022 Sberbank Serbia was taken over by AIK Bank, which continued to operate under the name Naša AIK Bank. Raiffeisen Bank bought Credit Agricole Bank in the same year, and in 2023 Adriatic Bank from Podgorica took over Expo Bank from Belgrade.

Based on data from the National Bank of Serbia in 2023, 20 banks operate in the banking sector of Serbia (NBS, 2023). They are mostly privately owned, except Postal Savings Bank, where the state has 72.64% of the shares, and Srpska Bank a.d. Belgrade with a 76.69% share (NBS, 2023).

In recent years, instability in the market and numerous movements caused by the crisis of global proportions after the COVID-19 pandemic caused instability in the banking market as well. The negative effects of the crisis were particularly present in transitional economies. Accordingly, the banking sector was exposed to numerous reforms and restructuring, as shown by the results of the research.

Effects of Mergers and Acquisitions on the Profitability of Banks in Serbia

The beginning of the 21st century in our banking market also marked the beginning of the restructuring of the banking sector. Restructuring in the Republic of Serbia was primarily manifested through the entry of foreign banks, increasing the openness of the banking market. The whole process led to privatization, reduced state ownership, and reduced state responsibility for eventual losses of individual banks. Buying and selling banks and taking over the capital and liabilities of other banks are conditioned by numerous motives. Most often, among the most important are (Zelenović & Babić, 2018): risk reduction, profit increase, cost reduction, competition reduction, efficiency increase, tax and market positioning, satisfaction of client needs, access to technology and more capable management. Banks on the local market strive to achieve economies of scale, while interstate mergers and acquisitions aim at the formation of larger international banks that have financial importance on the global market.

Regardless of the motives and goals of mergers and acquisitions, their impact on bank performance is inevitable. Mergers and acquisitions have an impact on capital, savings, liquidity, and profitability, but also on business costs, as the most important indicators of business success. This part of the paper deals with the analysis of the impact of mergers and acquisitions on the profitability of certain banks in the banking sector of the Republic of Serbia, which were part of this process, and which have a significant market share.

The profitability of banks in Serbia is determined by numerous factors, the most important of which are: bank size, ownership, income diversification, exposure to interest, credit and liquidity risk, capital, business efficiency and labor productivity. Macroeconomic factors that can affect the profitability of banks and the banking sector refer to the inflation rate, the level of gross domestic product, the stage of the economic cycle in which a specific country is located, regulatory mechanisms of the economy and the development of the financial system. For the purposes of this work, attention is paid, indirectly, to the analysis of the bank's size and its impact on profitability, given that the bank's size changes under the influence of mergers and acquisitions.

Due to the availability of information and the way of reporting, the research is based on the analysis of profitability indicators for the period from 2018 to 2022. Profitability indicators for Raiffeisen Bank, AIK Bank, Postal Savings Bank, NLB Komercijalna, and OTP Bank were presented.

The impact of mergers and acquisitions on the profitability of AIK Bank a.d. Belgrade

AIK bank started the takeover of Sberbank and Belgrade in 2021. Based on the data from Table 2, we can conclude that the main indicators of profitability ROA (Return on assets), and ROE (Return on equity) recorded growth from 2018 to 2020.

$$ROA = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

$$ROE = \frac{\text{Net Income}}{\text{Average Total Equity}}$$

In addition to these indicators, the net interest margin (NIM) was also analyzed as part of profitability.

$$NIM = \frac{\text{Interest Income} - \text{Interest Expense}}{\text{Total Assets}}$$

Table 2: Profitability Indicators of AIK Bank for the Period 2018-2022 in %

	2018	2019	2020	2021	2022
ROA	3.2	4.4	4.7	2.8	2.6
ROE	10.8	16.7	19.7	12	8.6
NIM	3.6	3.1	2.9	2.6	2.6

Source: author's, based on consolidated financial statements of AIK bank (2023).

The consequences of the global financial crisis caused by the COVID-19 pandemic, and the instability in the global financial market also affected the operations of banks in our country. In 2021, AIK Bank's profitability declined. The slowdown in economic activity due to the global crisis, but also the instability in the European market as a result of the outbreak of war between Russia and Ukraine, require the recapitalization of banks. For banks to maintain liquidity at the regulatory level, they cannot always spend funds from capital for risk protection, because over time they will use it up to the extent that the capital adequacy indicator falls below the minimum 12%. Consequently, banks need recapitalization to maintain liquidity at the required level. However, with recapitalization, banks collapse their profitability due to increased capital, but also higher costs of provisions and lower profit (or even loss), which is read through the formula for ROE. ROA recorded an increase from 2018 to 2020, while in the year of restructuring and thereafter it recorded a decline.

A decline in AIK Bank's profitability indicators in 2021 and 2022 is a consequence of the global financial crisis and market movements. During 2021, there was an increase in operating expenses in the total amount of 4 billion dinars compared to 2020, which is a consequence of the increase in costs in the field of intellectual services and the costs of performing business activities, due to the process of digitalization and the expansion of business. The increase in costs is accompanied by a decrease in income, in the same percentage. The movement of market interest rates and the rise of the reference interest rate led to a decline in AIK Bank's income. Capital adequacy indicators recorded a decline from 22.29% in 2020, to 20.37% in 2021, and in 2022 this indicator was 19.81% (AIK Bank, 2023). The bank's goal is to maintain the capital adequacy ratio to the requirements of the NBS. In addition to these indicators, the profitability and stability of the bank were also influenced by the level of problem loans in 2021, which was on the increase compared to the previous year. The share of non-performing loans in total loans in 2020 was 3.32%, while in 2021 this percentage was at the level of 4.21% (AIK Bank, 2023). The largest share of non-performing loans is held by loans of commercial companies. During the pandemic and subsequently, the largest number of activities were focused on monitoring, control, and risk assessment with the aim of profitable business.

The Impact of Mergers and Acquisitions on the Profitability of Raiffeisen Bank a.d. Belgrade

Table 3: Profitability Indicators of Raiffeisen Bank

	2018	2019	2020	2021	2022
ROA	2.6	2.1	1.6	1.8	2.1
ROE	12.3	11.2	9.5	12.2	16.8
NIM	3.4	3.1	2.2	2.6	2.6

Source: author's, based on the consolidated financial statements of Raiffeisen Bank (2023)

Raiffeisen Bank's profitability indicators have been declining in recent years. It is considered that the decline in banks' profitability is conditioned by the bad market environment, the decrease in banks' profits is due to the growth of the reference interest rates to which the interest rates of our banks are tied. In 2020, the NBS introduced a moratorium on bank loans due to the global financial crisis, and high amounts of provisions, which affected the drop in profitability. In 2022 the takeover of Credit Agricole Bank by Raiffeisen Bank was completed, and to some extent, this also increased profitability.

The growth of credit activity and the resolution of problem loans contribute to the increase of profitability indicators to the greatest extent. The ratio of problem loans decreased by 2.8% in 2022. Also, the movement of market interest rates caused the growth of interest income by 21.5% compared to 2021. The trend of operating expenses refers to their slower growth compared to income growth, which affects the operational result of the bank's operations during 2022, and recorded an increase of 37.7%. The capital adequacy indicator of 21.7% is significantly above the prescribed minimum. We can conclude that the change of ownership and the possible appearance of risk among clients did not threaten the basic indicators of the profitable and stable operation of Raiffeisen Bank.

The Impact of Mergers and Acquisitions on the Profitability of OTP Bank a.d. Belgrade

In 2007, OTP Bank first took over Niška, Kulska and Zepter Bank. Then, in 2017, they took over Vojvodanska Bank, and in 2019 bought Societe Generale Bank. In Table 4, profitability indicators are shown from 2020, due to the unavailability of data and financial reports before the integration. In 2020, the OTP banking group experienced a drop in profitability, and the indicators of ROA and ROE have a negative sign. The decrease in profitability is explained by the drastic drop in business income, by 5.8% compared to 2019. Analysts point out that the drop in operating income is the result of a 10.2% decrease in net income from fees and commissions. Mainly as a result of the strong effect of the pandemic and the state of emergency during the second quarter of 2020. Also, net interest income of 11.5 billion dinars was at a slightly lower level compared to 2019 by -1.9% (-217 million dinars), mainly as a result of the drop in interest income.

Table 4: Profitability Indicators of OTP Bank for the Period 2018-2022, in %

	2018	2019	2020	2021	2022
ROA			-0.06	1.17	1.51
ROE			-0.42	8.84	11.34
NIM			3.10	2.40	3.02

Source: author's, based on the consolidated financial statements of OTP Bank (2023)

As a result of the successfully implemented, most complex integration in the region, all in the midst of the pandemic, excellent business results with growing profitability, operational efficiency, and healthy growth of the loan portfolio, OTP Bank stood out as a leader in the banking market (OTP Bank, 2023). After the completed integration, the bank, during 2021 and 2022, managed to maintain and improve its position as the largest creditor of the economy and the population, as well as the market leader in factoring, leasing, and e-commerce services.

The Impact of Mergers and Acquisitions on the Profitability of the Postal Savings Bank a.d. Belgrade

Postal Savings Bank implemented integration with MTS Bank in 2021. After the merger, the Republic of Serbia acquired ownership of 70.5% of the shares of Postal Savings Bank. In terms of the size of the balance sheet, the bank is one of the smaller banks.

Table 5: Profitability Indicators of Postal Savings Bank

	2018	2019	2020	2021	2022
ROA	1.4	1.3	1.0	0.7	1.0
ROE	12.7	12.5	10.1	7.9	13.7
NIM	5.2	5.1	4.40	4.0	4.0

Source: author's, based on consolidated financial statements of Postal Savings Bank (2023)

Like other banks in the banking sector of the RS, Postal Savings Bank had a drop in profitability until 2021, partly due to business policy, reduced revenues, partly due to turbulent market conditions. After the takeover of MTS Bank and the stabilization of operations, the net interest margin was more stable, and the bank's profitability recorded a slight increase. The increase in profitability is the result of an increase in credit activity and business efficiency, a reduction in the ratio of non-performing loans and an increase in the capital adequacy ratio. The level of non-performing loans at the end of 2022 was 3.07%, which is below the level of this ratio of the RS banking sector (3.5%), while the capital adequacy ratio at the end of 2022 was 24.3% (Postal Savings Bank, 2023).

The Impact of Mergers and Acquisitions on the Profitability of NLB Komercijalna Bank a.d. Belgrade

The COVID-19 pandemic had a significant impact on the operations of all banks in the banking sector of the Republic of Serbia. When it comes to NLB Komercijalna Bank, a drastic drop in profitability was recorded in 2020, due to a 33% drop in business income compared to 2019, and a 48% year-over-year increase in provisioning and valuation allowances. Table 6 provides an overview of the basic profitability indicators of NLB Komercijalna Bank.

Table 6: Profitability Indicators of NLB Komercijalna Bank for the Period 2018-2022, in %

	2018	2019	2020	2021	2022
ROA	2.0	1.7	0.8	0.6	1.5
ROE	12.1	10.2	4.9	3.6	10.8
NIM	3.3	3.0	2.7	2.7	3.1

Source: author's, based on the consolidated financial statements of NLB Komercijalna bank (2023)

Based on the analyzed data, we can conclude that by 2020, and with the acquisition of Komercijalna Bank, the profitability of NLB Bank was in a slight decline, which we can conclude based on the movement of ROA and ROE indicators. In 2021 and 2022, the increase in profitability is explained by the increase in net income from interest and fees.

The consolidation of the Serbian banking market continued during 2022, so after the merger of Komercijalna Bank and NLB Bank, the number of banks in the RS banking sector was 21. As a result of new mergers and the previous one that happened in recent years, five banks retain 70.8% of the banking sector's assets. The concentration of the banking sector was forced by the necessity of digitalization of banking products and the inability of smaller banks to support the process of innovation.

Conclusion

This research examines mergers and acquisitions as growth-oriented strategies and their impact on the profitability of certain banks in the Republic of Serbia. The wave of mergers and acquisitions was particularly pronounced during the global crisis of 2008, only to be repeated in 2020 with the pandemic of the COVID-19 virus and the war between Ukraine and Russia, which caused another crisis of global proportions. The focus of this paper was on the analysis of the basic profitability indicators of individual banks in the Republic of Serbia, among which are AIK Bank, OTP Bank, Raiffeisen Bank, Postal Savings Bank and NLB Komercijalna Bank. The general conclusion is that reducing operating costs and increasing income, reducing the ratio of problematic loans and increasing the level of capital adequacy, as well as increasing the size of the bank, affect the increase in basic profitability indicators.

The results of the analysis of AIK Bank's indicators show that AIK Bank had a growing profitability measured by ROA and ROE indicators in the period 2018-2020, so during 2021, the value of these indicators fell sharply and that trend continued until the end of the observed period. At the same time, NIM recorded a constant decline during the observed period. The available data from this bank's report are not sufficient to conclude whether the decline in the value of basic profitability indicators would have been greater if AIK Bank had not carried out the takeover of Sberbank.

Analyzing Raiffeisen Bank's profitability indicators, we conclude that there is a continuous decline in these indicators, so after the takeover of Credit Agricole Bank, the basic indicators would record an increase compared to the years before the takeover. The increase in the value of the indicators, on the one hand, is the result of the takeover, which is in accordance with the conclusions of numerous authors, while on the other hand, it may be the result of numerous activities of regulatory authorities for the recovery of the economy after the pandemic. However, the data based on the research that was conducted is not sufficient to conclude about the effect of these factors on the profitability of a specific bank.

OTP Bank had the biggest drop in profitability in the observed period, as indicated by the ROA and ROE indicators, which have a negative sign in 2020. Given that financial reports are not available before the business activities are carried out, the available data is not sufficient for a valid conclusion. It is assumed that the growth of profitability in 2022 is the result of the recovery of the economy after the pandemic.

When it comes to the Postal Savings Bank, as one of the smaller banks in our banking sector, we see that the indicators of ROA, ROE and NIM record a continuous decline from 2018 to 2021. After the takeover of MTS Bank by Postal Savings Bank, these indicators increased in 2022. It is an open question and may be the subject of future research whether the stabilization and growth of the bank's profitability is the result of the takeover or the improvement of the general situation in the banking financial market.

The profitability of NLB Komercijalna Bank measured by ROA, ROE and NIM was in decline in the period 2018-2021. The unprofitable operations of Komercijalna Bank necessitated the acquisition of NLB Bank. After these business activities, NLB Komercijalna Bank had a growing profitability in 2022. However, the data from the report is not enough to say with certainty that the growing profitability is the result of the acquisition.

The results of this research show that, on the example of individual banks in the banking sector of the Republic of Serbia, the implemented activities of mergers and acquisitions in the short term did not lead to an improvement in business performance, as shown by the basic indicators of profitability. There is a possibility that these activities led to an increase in the profitability and stability of the banks that were part of the restructuring process, but this may be the subject of future research.

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TREĆI BIG SCIENCE BUSINESS FORUM 2024 U TRSTU 1-4. OKTOBAR

Očekuje se 1.000 delegata na događaju i 500 kompanija i organizacija iz 30 zemalja

Trst će od 1. do 4. oktobra 2024. godine u Kongresnom centru biti domaćin ovogodišnjeg BSBF-a, Naučnog poslovnog foruma, međunarodne poslovne konferencije koja okuplja glavne evropske istraživačke infrastrukture, sada akreditovane kao glavno mesto okupljanja istraživačke infrastrukture i industrije.

BSBF se predstavlja kao prva „sve na jednom mestu“ konferencija za evropske kompanije i druge organizacije zainteresovane za interakciju sa velikim evropskim naučnim organizacijama. Cilj BSBF-a je da stvori snažnije, transparentnije i efikasnije zajedničko tržište bez prepreka za veliku nauku u Evropi, i da stvori prostor za industrijske dobavljače koji žele da uspostave odnose sa velikim istraživačkim instalacijama. BSBF2024 predstavlja jedinstvenu priliku za evropske kompanije i organizacije da budu informisane i uključene u tendere i konkurse vredne milijarde evra godišnje kojima direktno upravljaju velike naučne organizacije (BSO), u skladu sa specifičnim pravilima i procedurama.

BSBF2024, za koji je sada otvorena pojedinačna registracija, obuhvata bogat program, od plenarnih sednica do izložbi, B2B sastanaka i poseta. Umrežavanje je ključni stub foruma, a delegati će imati priliku da rezervišu B2B sastanke sa predstavnicima BSO, preduzeća i institucija. Pored toga, konferencija uključuje i izložbu, sa više od 150 štandova dostupnih evropskim kompanijama i međunarodnim zainteresovanim stranama. Na plenarnim sednicama generalni direktori iz deset velikih naučnih organizacija će dati pregled budućih projekata svojih organizacija i otvorenu diskusiju.

Među aktivnostima BSBF-a postoji nekoliko poziva, od kojih su tri još uvek otvorena: poziv BSBF2026, poziv velikog naučnog tržišta (Big Science Common Market Call), praćenje prenosa tehnologije (Technology Transfer Track poziv). Prvim pozivom organizatori BSBF Trst 2024 sada pozivaju zainteresovane da se kandiduju za domaćine BSBF2026. Zemlje, regioni ili gradovi širom Evrope se podstiču da se kandiduju za sledeće domaćine, u skladu sa specifičnim elementima koji se zahtevaju u pozivu za BSBF2026. Poziv BSCM-a ima za cilj da prikupi iskustva istaknutih industrijskih aktera, koji su dobili ugovore od strane različitih BSO-a, a zatim da formuliše mapu puta i sugestije za standardizaciju procedura pristupa u namenskoj paralelnoj sesiji i otvorenoj diskusiji na plenarnoj sednici. Učešće u TTT pozivu pruža priliku industrijama i predstavnicima BSO-a da predstave svoje postere kvalifikovanoj publici, da prezentuju svoje inovativno rešenje/nove tehnologije/prilike za finansiranje, da promovišu svoj brend na veb stranici BSBF2024, i da prate interesovanje stejkholdera preko alata dostupnih u aplikaciji BSBF2024.

Prvi BSBF-a, čiji je domaćin bila Danska agencija za nauku i visoko obrazovanje u Kopenhagenu, bio je izuzetno uspešan, a slične rezultate je postigao i drugi BSBF koji je održan u Grenadi, Španija: sa više od 1.000 delegata iz preko 500 kompanija i organizacija iz 30 zemalja. U izložbenom prostoru bilo je više od 100 kompanija i organizacija, a tokom događaja održano je oko 800 B2B i B2C sastanaka. BSBF je ponudio uvid u mogućnosti nabavke i naručivanja za kompanije ukupne vrednosti od skoro 10 milijardi evra godišnje.

Italijansku kandidaturu Trsta, koju promovišu Autonomna regija Furlanija-Juljska krajina, ILO Network Italia (CNR, ENEA, INAF i INFN), AREA naučni park Trst i Promoturismo FVG, podržala je Centralno-evropska inicijativa, prvi međunarodni forum za zemlje Centralne, Istočne i Jugoistočne Evrope sa sedištem u Trstu. Međunarodni organizacioni komitet (IOC), promoter Foruma, obuhvata niz međunarodnih istraživačkih centara: CERN, ESA, ESO, ESRF, ESS, evropski KSFEL, FAIR, ILL, F4E, SKAO. Lokalni organizacioni komitet (LOC) čine Autonomna regija Furlanija-Juljska krajina, Opština Trst, Park nauke, Promo Turismo FVG, Univerzitet u Trstu, Privredna komora regije Furlanija-Juljska krajina.

Izbor Trsta za BSBF 2024 nije neočekivan: Trst je dom velikom broju evropskih istraživača i brojnih nacionalnih i međunarodnih centara i tela naučne izvrsnosti. Među njima je Centralnoevropski konzorcijum za istraživačku infrastrukturu (CERIC), otvorena pristupna tačka nekim od najnaprednijih naučnih istraživačkih objekata u osam centralnoevropskih zemalja (Austrija, Hrvatska, Češka, Italija, Poljska, Rumunija, Slovenija, Mađarska) u oblasti materijala, biomaterijala, nanotehnologija, sa posebnim osvrtom na teme energetike i nauke o životu. Drugi entiteti koji čine naučno tkivo grada su Elettra Sincrotrone Trst, Međunarodni centar za genetičko inženjerstvo i biotehnologiju (ICGEB), Međunarodni centar za teorijsku fiziku (ICTP), Međunarodna škola za napredne studije (SISSA), Nacionalni institut za okeanografiju i primenjenu geofiziku (OGS), Nacionalni institut za nuklearnu fiziku (INFN), Nacionalni istraživački savet (CNR), Svetska akademija nauka (TVAS).

Intervjuisali smo Alesiju Rosolen, savetnicu za rad, obuku, obrazovanje, istraživanje, univerzitete i porodicu regije Furlanija-Juljska krajina, i Paola Akunza iz ENEA, direktora BSBF Trst 2024.

U kojoj je fazi organizacija BSBF-a i šta vam je na raspolaganju za narednih nekoliko meseci?

P.A.: "Organizacija foruma je u skladu sa programom. Prijave su otvorene od sredine marta. Prikupljamo sponzorstva, a ostalo je malo izložbenih prostora koji još nisu rezervisani. Program intervencija je odobrio međunarodni organizacioni komitet i u toku je definisanje daljih aspekata, poput kolateralnih događaja. Pripremu oktobarskog događaja prati intenzivna promotivna aktivnost inicijative, koja je počela još 2022. god. Mora se pomenuti i pratnja kompanija u posetama BSO i promocija BSBF-a u kancelarijama italijanske ambasade zemalja zapadnog Balkana.

U narednih nekoliko meseci bićemo zauzeti finalizacijom promotivnih poseta i organizacijom završnih logističkih aspekata".

Zašto je važno uključiti balkanske zemlje u veliko evropsko tržište nauke?

A.R.: "Evropi je potrebno uključivanje svih raspoloživih resursa i veština da bi ostala konkurentna na globalnim tržištima, posebno u oblasti fokusiranoj na visoke tehnologije i inovacije kao što je Big Science. Iz tog razloga, direktna uključenost geografskog područja kao što je centralno-istočna Evropa iz koje ima nekoliko primera industrijskog učešća se smatra zajedničkim ciljem rasta BSBF brenda od evaluacije kandidature Trsta. U tom kontekstu, prvo iskustvo u Srbiji je svakako bilo uspešno".

Kako ih angažuje Big Science Business Forum?

P.A.: "Tradicionalno otvaranje Trsta prema ovim teritorijama razvilo se kroz promotivne posete raznim zemljama u okruženju, a „roadshow“ je svečano otvoren 27. februara u Beogradu. Zahvaljujući saradnji CEI – Centralnoevropske inicijative, Ministarstva spoljnih poslova i italijanskih ambasada u ovim prestonicama, održavaju se sastanci na kojima se planirane aktivnosti BSBF-a prezentuju onim nacionalnim subjektima zainteresovanim za veliku nauku. Posle Beograda, već su planirani drugi termini u Bratislavi, Pragu, Varšavi i Budimpešti. Konačno, paralelna sesija tokom Foruma koja je zakazana za 2. oktobar u Trstu, biće posvećena davanju maksimalnog značaja veštinama koje su identifikovane u Centralno-Istočnoj Evropi tokom ovog putujućeg foruma”.

Kako izbor Trsta za treći BSBF može uticati na jačanje evropskog tržišta velike nauke?

A.R.: "Nije u pitanju samo izbor Trsta, već izbor Italije. Sećam se da se italijanska industrija svrstava među najveće dobavljače tehnologija i usluga za velike naučne organizacije. Cilj nam je bio, radeći u bliskoj saradnji sa Ministarstvom spoljnih poslova i međunarodne saradnje i CEI, uključivanje zemalja centralno-istočne Evrope sa nadom da će nam ovi veoma pozitivni naponi omogućiti da proširimo broj uključenih kompanija”.



Ministero degli Affari Esteri
e della Cooperazione Internazionale



Ministero delle Imprese
e del Made in Italy



MINISTERO DELL'AMBIENTE
E DELLA SICUREZZA ENERGETICA



REGIONE AUTONOMA
FRIULI VENEZIA GIULIA



ILO
Network
Italia

Rete Industrial Liaison Officers



IO SONO
FRIULI
VENEZIA
GIULIA



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THIRD EDITION OF THE BIG SCIENCE BUSINESS FORUM 2024 IN TRIESTE

1,000 delegates are expected at the event scheduled from 1st to 4th October and 500 companies and organizations from 30 countries

Trieste will host, from 1st to 4th October 2024 in the Trieste Convention Center, the next edition of the BSBF, Big Science Business Forum, an international business-oriented conference that brings together the main European research infrastructures, now accredited as the main meeting point between research infrastructures and industry.

BSBF proposes itself as the first “one-stop shop” for European companies and other organizations interested in interacting with large European scientific organizations. BSBF’s aim is to create a stronger, more transparent, efficient and barrier-free common market for big science in Europe and provide space for industrial suppliers who want to establish relationships with large research installations. BSBF2024 represents a unique opportunity for European companies and organizations to be informed and involved in tenders and competitions worth billions of euros per year managed directly by Big Science Organizations (BSOs), according to specific rules and procedures.

The BSBF2024, for which Individual registration is now open, includes a rich program, from plenary sessions to exhibitions, from B2B to visits. Networking is a key pillar of the forum, delegates will have the opportunity to book B2B with representatives from BSOs, businesses and institutions. Furthermore, the conference also includes an exhibition, with more than 150 stands available for European companies and international stakeholders. In Plenary Sessions the Director Generals from the ten BSOs will provide an overview of their organisations’ future projects and an open discussion.

Among the BSBF activities there are several Calls, three of which are still open: BSBF2026 call, Big Science Common Market Call (BSCM Call), Technology Transfer Track (TTT Call). With the first call, BSBF Trieste 2024 organizers are now inviting bids for hosting BSBF2026. Countries, regions, or cities across Europe are encouraged to submit bids to become the next host, according to the specific elements required in the BSBF2026 Call. The BSCM Call aims to collect the experiences of some prominent industrial actors, who have been awarded contracts by different BSOs, and then to formulate a roadmap and suggestions for standardizing access procedures in a dedicated parallel session and an open discussion in a plenary session. Participation in TTT Call provides an opportunity for industries and BSO representatives to present their posters to a qualified audience, to see the presentation of their innovative solution/new technology/funding opportunity and their institutional branding posted on the BSBF2024 website, and to track stakeholder interest in the event through the tools available on the BSBF2024 app.

The first edition of the BSBF, hosted by the Danish Agency for Science and Higher Education in Copenhagen, Denmark, was a great success and similar results were also achieved by the second edition of the BSBF which was held in Granada, Spain: more than 1,000 delegates from over 500 companies and organizations from 30 countries. The exhibition area saw the presence of more than 100 companies and organizations and about 800 B2B and B2C meetings took place during the event. BSBF offered insights into procurement and order opportunities for companies worth a total of almost 10 billion euros per year.

The Italian candidature of Trieste, promoted by the Autonomous Region of Friuli Venezia Giulia, ILO Network Italia (CNR, ENEA, INAF and INFN), Area Science Park of Trieste and Promoturismo FVG, was supported by the Central European Initiative, the first international forum for Central, Eastern and South-Eastern Europe countries based in Trieste. The International Organizing Committee (IOC), promoter of the Forum, includes a series of international research centers: CERN, ESA, ESO, ESRF, ESS, European XFEL, FAIR, ILL, F4E, SKAO. The Local Organizing Committee (LOC) comprises Friuli Venezia Giulia Region, Municipality of Trieste, Area Science Park, Promo Turismo FVG, University of Trieste, Venezia Giulia Chamber of Commerce.

The choice of Trieste for the BSBF 2024 is not unexpected: the city has one of the highest concentrations of researchers in Europe and is home to numerous national and international centers and bodies of scientific excellence. Among these is the Central European Research Infrastructure Consortium (CE-RIC), an open access point to some of the most advanced scientific investigation facilities in eight Central European countries (Austria, Croatia, Czech Republic, Italy, Poland, Romania, Slovenia, Hungary) in the fields of materials, biomaterials, nanotechnologies, with particular attention to the topics of energy and life sciences. Other entities that form the scientific tissue of the city are Elettra Sincrotrone Trieste, International Centre for Genetic Engineering and Biotechnology (ICGEB), International Centre for Theoretical Physics (ICTP), International School for Advanced Studies (SISSA), National Institute of Oceanography and Applied Geophysics (OGS), National Institute for Nuclear Physics (INFN), National Research Council (CNR), The World Academy of Sciences (TWAS).

We interviewed Alessia Rosolen, Councillor for Labour, Training, Education, Research, Universities, and Family of the Friuli Venezia Giulia Region, and Paolo Acunzo of ENEA, Director of the BSBF Trieste 2024.

At what stage is the organization of the BSBF and what do you have in store for the next few months?

P.A.: "The organization of the forum is in line with the programming. Registrations are open from mid-March. We are collecting sponsorships and the exhibition spaces not yet booked are running out. The program of interventions has been approved by the international organizing committee and further aspects are being defined, such as collateral events. The preparation of the October event is accompanied by an intense promotional activity for the initiative, which has started as early as 2022. Mention must be made of both the accompaniment of companies on visits by the BSOs and the promotion of BSBF at the offices of the Italian embassies of the Western Balkans area's countries.

The next few months will see us busy closing the roadshow and organizing the final logistical aspects".

Why is it important to involve Balkan countries in a European Big Science market?

A.R.: "Europe needs the involvement of all available resources and skills to remain competitive in global markets, particularly in a field focused on high technology and innovation such as Big Science. For this reason, the direct involvement of a geographical area such as that of Central-Eastern Europe from which there are few examples of industrial participation has been considered a common growth objective of the BSBF brand since the evaluation of Trieste's candidacy. In this context, the first experience in Serbia was certainly a success".

How is the Big Science Business Forum engaging them?

P.A.: "Trieste's traditional opening to these territories developed through a real roadshow in various countries in the area, inaugurated last February 27th in Belgrade. Thanks to the collaboration of the CEI - Central European Initiative, the Ministry of Foreign Affairs and the Italian embassies in these capitals, meetings are taking place to present the planned activities of the BSBF to those national entities interested in Big Science. After Belgrade, other dates are already planned in Bratislava, Prague, Warsaw and Budapest. Finally, a parallel session during the Forum is scheduled for 2nd October in Trieste, dedicated to giving maximum relevance to the skills identified in Central-Eastern Europe during this roadshow".

How can the choice of Trieste for the third edition of the Big Science Business Forum impact the strengthening of a European Big Science market?

A.R.: "It is not just the choice of Trieste, but it is the choice of Italy. I remember that the Italian industry ranks among the top suppliers of technologies and services to Big Science Organizations. We aimed, working in close collaboration with the Ministry of Foreign Affairs and International Cooperation and the CEI, on inclusion of the countries of Central Eastern Europe with the hope that these very positive efforts will allow us to expand the number of companies involved".



BAROMETAR/BAROMETER

FEBRUAR 2024 – APRIL 2024. / FEBRUARY 2024 - APRIL 2024

1.PROMET / TURNOVER

Mesec/ Month	Listing	Open Market	Regulisano Tržište/Regu- lated market	MTP/MTF	Ukupno/ Total	Broj transakcija/ Number of transactions
Februar 2024	1.289.032.043	337197.060	1.626.229.103	24.900	1.626.254.003	1.853
Mart 2024	3.695.722.510	182.293.919	3.878.016.429	0	3.878.016.429	1.690
April 2024	2.631.258.012	69.316.166	2.700.574.178	43.063.160	2.743.637.338	2.074
	7.616.012.566	588.807.145	8.204.819.711	43.088.060	8.247.907.771	5.617

*RSD

2. INDEKSI / INDICES

Feb 2024 – Apr 2024		BELEX15	BELEXline
	Poslednja vrednost / Last value	1005,15	2208,46
	Promena (abs) / Change (abs)	129,49	294,42
	Promena (%) / Change (%)	14,79%	15,38%
	Najviša vrednost / Maximum value	1017,7	2208,46
	Najniža vrednost / Minimum value	844,06	1751,12
	Istorijski max / History maximum value	3335,2	5007,34
	Istorijski min / History minimum value	347,46	841,99
	Vrednost prometa / Value of turnover	279.661.948,00	338.235.869,00

3. TRŽIŠNA KAPITALIZACIJA / MARKET CAPITALISATION

	November	December	January
Ukupna tržišna kapitalizacija/ Total market capitalisation	428.192.909	447.901.577	452.692.383
Regulisano tržište/Regulated Market	419.736.674	439.456.321	444.256.600
Listing			
Prime Listing – akcije/ Prime Listing – shares	212.803.451	225.896.666	229.634.686
Standard Listing – akcije/ Standard Listing – shares			
Open Market	206.933.223	213.559.655	214.621.914
MTP/MTF	8.456.235	8.445.256	8.435.782
BELEX15	254.237.096	254.963.783	255.873.243
BELEXline	268.388.912	269.935.222	271.239.436

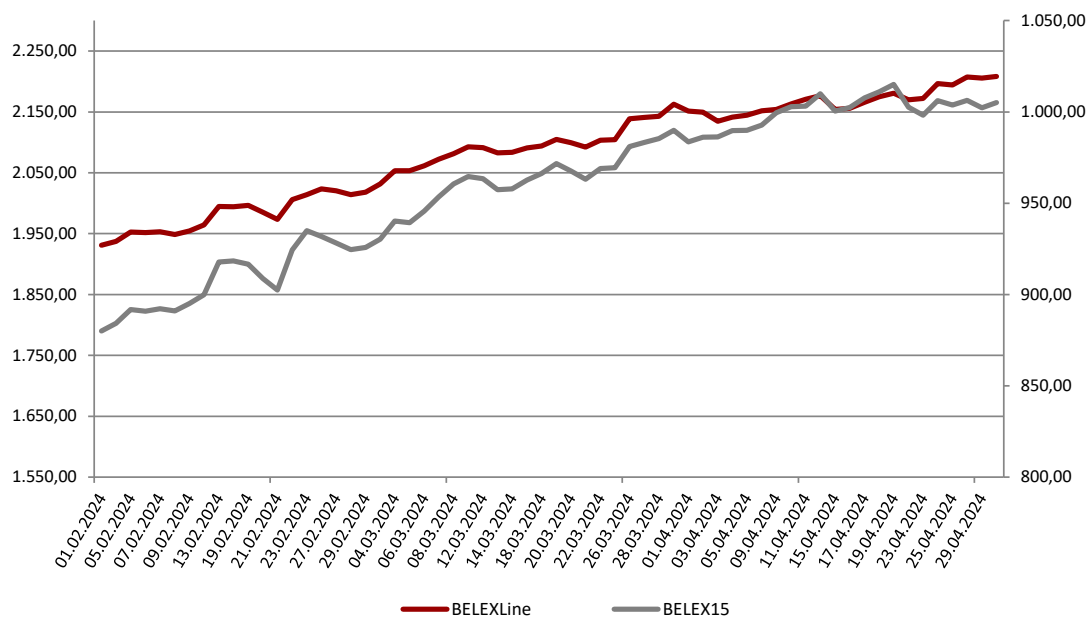
*u hiljadama RSD / in RSD thousands

4. UČEŠĆE STRANIH INVESTITORA / FOREIGN INVESTORS PARTICIPATION

Feb 2024 – Apr 2024	Učešće stranih investitora / Foreign Investors Participation		
	FIS	total	7,33%
		b-FIS	10,69%
		s-FIS	3,96%
	FIB		4,30%
	FIT		4,73%

Indeks_Belx15	Indeks_BELEXLine	Datum	BELEX15	BELEXLine
BELEX15	BELEXLine	01.02.2024	880,10	1.931,07
BELEX15	BELEXLine	02.02.2024	884,19	1.937,33
BELEX15	BELEXLine	05.02.2024	891,79	1.952,81
BELEX15	BELEXLine	06.02.2024	890,89	1.951,62
BELEX15	BELEXLine	07.02.2024	892,27	1.953,16
BELEX15	BELEXLine	08.02.2024	891,10	1.948,54
BELEX15	BELEXLine	09.02.2024	895,08	1.954,42
BELEX15	BELEXLine	12.02.2024	899,90	1.964,31
BELEX15	BELEXLine	13.02.2024	917,78	1.994,56
BELEX15	BELEXLine	14.02.2024	918,48	1.994,03
BELEX15	BELEXLine	19.02.2024	916,60	1.996,50
BELEX15	BELEXLine	20.02.2024	908,72	1.984,98
BELEX15	BELEXLine	21.02.2024	902,42	1.973,63
BELEX15	BELEXLine	22.02.2024	924,48	2.006,05
BELEX15	BELEXLine	23.02.2024	934,91	2.014,06
BELEX15	BELEXLine	26.02.2024	931,88	2.023,73
BELEX15	BELEXLine	27.02.2024	928,19	2.020,20
BELEX15	BELEXLine	28.02.2024	924,59	2.014,23
BELEX15	BELEXLine	29.02.2024	925,84	2.017,96
BELEX15	BELEXLine	01.03.2024	930,35	2.031,65
BELEX15	BELEXLine	04.03.2024	940,19	2.053,24
BELEX15	BELEXLine	05.03.2024	939,27	2.053,18
BELEX15	BELEXLine	06.03.2024	945,65	2.061,54
BELEX15	BELEXLine	07.03.2024	953,47	2.072,31
BELEX15	BELEXLine	08.03.2024	960,58	2.081,44
BELEX15	BELEXLine	11.03.2024	964,61	2.092,50
BELEX15	BELEXLine	12.03.2024	963,37	2.091,28
BELEX15	BELEXLine	13.03.2024	957,38	2.082,75
BELEX15	BELEXLine	14.03.2024	957,81	2.083,49
BELEX15	BELEXLine	15.03.2024	962,72	2.090,65
BELEX15	BELEXLine	18.03.2024	966,25	2.093,82

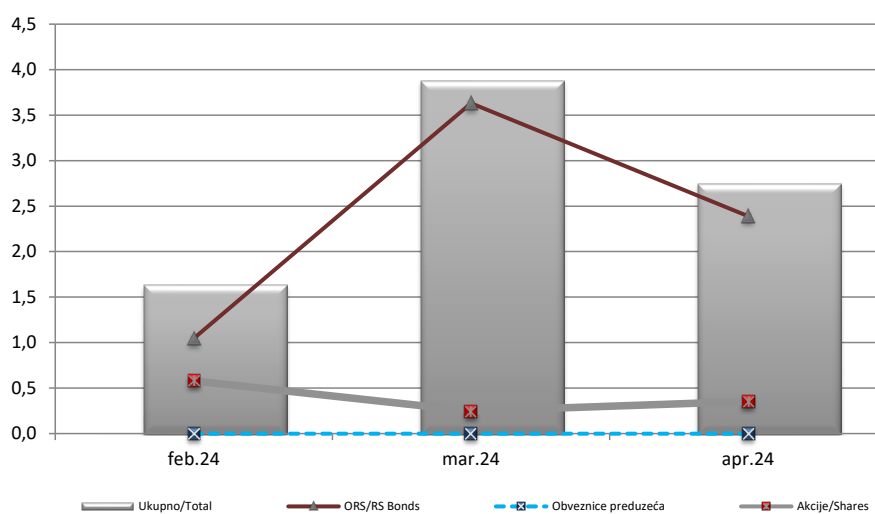
BELEX15	BELEXLine	19.03.2024	971,76	2.104,63
BELEX15	BELEXLine	20.03.2024	967,59	2.099,26
BELEX15	BELEXLine	21.03.2024	963,10	2.092,02
BELEX15	BELEXLine	22.03.2024	968,97	2.103,42
BELEX15	BELEXLine	25.03.2024	969,38	2.104,59
BELEX15	BELEXLine	26.03.2024	981,08	2.138,63
BELEX15	BELEXLine	27.03.2024	983,30	2.140,82
BELEX15	BELEXLine	28.03.2024	985,47	2.142,96
BELEX15	BELEXLine	29.03.2024	989,95	2.162,70
BELEX15	BELEXLine	01.04.2024	983,60	2.151,33
BELEX15	BELEXLine	02.04.2024	986,13	2.149,65
BELEX15	BELEXLine	03.04.2024	986,25	2.134,48
BELEX15	BELEXLine	04.04.2024	989,81	2.141,24
BELEX15	BELEXLine	05.04.2024	989,97	2.144,53
BELEX15	BELEXLine	08.04.2024	992,83	2.151,74
BELEX15	BELEXLine	09.04.2024	999,55	2.154,13
BELEX15	BELEXLine	10.04.2024	1.002,85	2.163,24
BELEX15	BELEXLine	11.04.2024	1.003,12	2.170,90
BELEX15	BELEXLine	12.04.2024	1.009,91	2.176,75
BELEX15	BELEXLine	15.04.2024	1.000,46	2.153,93
BELEX15	BELEXLine	16.04.2024	1.002,45	2.156,02
BELEX15	BELEXLine	17.04.2024	1.007,65	2.165,80
BELEX15	BELEXLine	18.04.2024	1.010,93	2.174,89
BELEX15	BELEXLine	19.04.2024	1.015,11	2.180,61
BELEX15	BELEXLine	22.04.2024	1.002,51	2.169,73
BELEX15	BELEXLine	23.04.2024	998,23	2.172,06
BELEX15	BELEXLine	24.04.2024	1.006,10	2.196,58
BELEX15	BELEXLine	25.04.2024	1.003,84	2.194,10
BELEX15	BELEXLine	26.04.2024	1.006,25	2.207,40
BELEX15	BELEXLine	29.04.2024	1.002,28	2.205,60
BELEX15	BELEXLine	30.04.2024	1.005,15	2.208,46



	Ukupno/Total	ORS/RS Bonds	Obveznice preduzeća	Akcije/Shares
feb.24	1.626.254.001	1.046.198.480	0	580.055.521
mar.24	3.878.016.429	3.630.292.610	0	247.723.819
apr.24	2.743.637.337	2.390.069.207	0	353.568.130

U dinarima / RSD

FEB 2024 - APR 2024





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