

Udruženje banaka Srbije

BANKARSTVO

2-3/2024

ISSN 2466-5495 | COBISS.SR-ID 109903884



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Odlukom Matičnog naučnog odbora za pravo, ekonomiju i političke nauke Ministarstva prosvete, nauke i tehnološkog razvoja časopis *Bankarstvo* je registrovan na listi naučnih časopisa u kategoriji M52.

According to the Decision of the Central Scientific Committee for Law, Economics and Political Sciences, within the Ministry of Education, Science and Technological Development, *Bankarstvo* Journal is registered in the list of scientific journals in the category M52.

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All papers undergo double blind peer review.*

**Časopis *Bankarstvo* je registrovan u bazama /
Bankarstvo Journal is registered in the following databases**

SCIndeks

<http://scindeks.ceon.rs/journaldetails.aspx?issn=1451-4354>

EBSCO

<http://www.ebscohost.com/corporate-research/business-source-corporate-plus>

DOAJ

<https://doaj.org/toc/2466-5495>

CEEOL

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EconBiz

<https://www.econbiz.de/Record/bankarstvo/10010373502> - online
<https://www.econbiz.de/Record/bankarstvo/10001863330> - print

ERIH PLUS

<https://dbh.nsd.uib.no/publiseringskanaler/erihplus/periodical/info?id=496397>

ISSN 2466-5495 (Online)

Bankarstvo

2-3/2024

Godina izdanja / Year of Publishing

53. godina izdanja / 53rd Year of Publishing

Redovni brojevi časopisa, na srpskom i engleskom jeziku, izlaze tri puta godišnje - četvoromesečno/
Regular issues of the journal, in Serbian and in English, are published three times per year

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UVODNA REČ

Dr Sladjana Sredojević
Urednik

Poštovani čitaoci, saradnici časopisa Bankarstvo i drage kolege,

Dostizanje i očuvanje konkurentnosti ekonomije u uslovima značajnih globalnih promena je paradigma koja je obeležila period koji je za nama. Svedočili smo brojnim referentnim izveštajima i međunarodnim analizama o dosadašnjem postignuću u relevantnim oblastima koji su od značaja za poverenje investitora, kvalitativni razvoj ekonomije i jačanje opšteg nivoa blagostanja građana i društva, i to od evropskih, regionalnih do nacionalnih. Opredelili smo se za neke od njih koji su obeležili period.

Evropski nivo - Izveštaj objavljen 2024. godine Konkurentnost EU: pogled unapred (EU competitiveness: Looking ahead) koji je pripremio Mario Draghi, bivši predsednik Evropske centralne banke i Izveštaj Budućnost jedinstvenog tržišta (Much more than a market) čiji je autor Enrico Letta, bivši premijer Vlade Italije, detaljno prikazuju zaostatak evropske konkurentnosti u odnosu na Sjedinjene Američke Države i Kinu. S tim u vezi, ukazuju na značajne strateške rizike koji iziskuju najveću pažnju u narednom srednjoročnom periodu, kao što su: realizacija zelene tranzicije - Zeleni dogovor za 2025. godinu, ubrzano starenje stanovništva, rastući troškovi odbrane, tražnja za izvorima finansiranja ekonomije Evrope, deglobalizacija, rigidna regulativa i administracija kao glavna prepreka razvoju inovativne tehnologije u Evropi.

Stoga, novom sastavu Evropske komisije i Evropskog Parlamenta za naredni srednjoročni period se ukazuje na moguće strateške pravce delovanja kao što su:

1. Neophodnost jačanja konkurentnosti Evrope kroz favorizovanje inovacija, efikasno i jedinstveno tržište, i trgovinsku i fiskalnu politiku koja bi osigurala jednake uslove i autonomiju. Takođe, to uključuje i porast produktivnosti koja bi trebalo da se odvija u pravcu obrazovanja, unapređenja kompetencija i veština radne snage.
2. Dekarbonizacija i održivo poslovanje – dalja primena svih donetih propisa, taksonomija, direktiva (SFDR), i sl. Takođe, rad na otvorenim pitanjima kao što su: Zelene obveznice (da li će funkcionisati ili će biti samo centar za usklađenost), uloga malih i srednjih preduzeća, i obaveza izveštavanja o primeni ESG faktora.
3. Pravednost/kohezija/konvergencija – sredstva EU se isplaćuju da bi se ostvarila kohezija, ravnomerni regionalni razvoj i efikasno trošenje javnih sredstava i fondova. Integracija se odnosi i na spoljne granice EU, pa je shodno tome, Evropska komisija 8. novembra 2023. godine usvojila Plan rasta za Zapadni Balkan, sa ciljem da integriše partnere sa Zapadnog Balkana u jedinstveno tržište EU, unapredi regionalnu ekonomsku saradnju, produbi reforme vezane za EU, poveća pretpristupno finansiranje u cilju ubrzanja socio-ekonomskog približavanja Zapadnog Balkana EU.

4. Jačanje bezbednosno-odbrambenih kapaciteta u cilju nezavisnosti i otpornosti – u periodima globalnih kriza, konstatovana je visoka zavisnost Evrope i njenih kompanija od drugih i to u više oblika: energetske od Rusije, sirovinске i proizvodne od Kine i bezbednosne i političke od SAD. Stoga je nužno proizvoditi i ne zavisiti ekonomski i politički od drugih.

I implicitno i eksplicitno, u kontekstu navedenih strateških stubova, banke su pozvane da finansiraju takve ciljeve i sektore, uključujući i verovatno određene delove lanca snabdevanja u sektoru odbrane.

Regionalni nivo - OECD je pripremio i publikovao Regionalni profil Perspektive konkurentnosti Zapadnog Balkana 2024 (Western Balkans Competitiveness Outlook 2024), kao i Platformu za podatke o konkurentnosti Zapadnog Balkana. Procenjene dimenzije konkurentnosti – mereno kroz javne politike i njihove performanse – kao i trendovi i poređenja performansi Zapadnog Balkana ukazuju da su u oblastima infrastrukture i digitalizacije dostignuća relevantna, dok je suprotno tome napredak bio vidno manji u klasterima veština, zelene agende i poslovnog okruženja. Zato su date preporuke za dalje osnaživanje konkurentnosti regiona kroz:

1. Nužnost jačanja sektora obrazovanja u cilju sticanja znanja i veština koje su usklađene sa budućim potrebama tržišta rada;
2. Jačanje napora ka dekarbonizaciji i održivom ekonomskom rastu;
3. Uklanjanje prepreka koje onemogućavaju jednake šanse za kompanije.

Takođe, Izveštaj Ocena održivog finansiranja na Zapadnom Balkanu: perspektive za taksonomiju održivog finansiranja (Assessment of Sustainable Finance in Western Balkans: Prospects for Sustainable Finance Taxonomy) koji je nastao kao rezultat eksterne ocene aktivnosti u polju održivog finansiranja od strane Regional Cooperation Council (RCC), prepoznaje oblast održivog finansiranja kao aspekt konkurentnosti i značaj bankarskog sektora Srbije na više nivoa. Kao primer dobre prakse u regionalnom kontekstu, Izveštaj navodi uspešnu saradnju banaka, UBS i IFC u proteklom trogodišnjem periodu u okviru IFC ESG Integrated programa, i posebno zajednički rad na Smernicama za jačanje kapaciteta banaka za primenu politika ESG i održivog finansiranja i aktivnosti edukacije i podrške bankama za uvođenje sistema ESG.

Nacionalni nivo - konačno, i na nacionalnom nivou, poboljšanje dugoročnog državnog rejtinga sa statusa neinvesticionog „BB+“, na investicioni „BBB-“, procenjeno i objavljeno početkom oktobra 2024 od strane rejting agencije Standard and Poor's za poboljšanje konkurentnosti nacionalne ekonomije, ide u prilog aktuelnoj temi nove važne globalne paradigme – dostizanje i jačanje konkurentnosti.

Svaki od pobrojanih pregleda, analiza i izveštaja ukazuje na značaj daljeg ulaganja u ljudske nove kompetencije, znanja i veštine sadašnjih i budućih zaposlenih, održivo poslovanje, odgovarajuće modele digitalizacije i primene veštačke inteligencije, kao generatore novih inovacija i rasta produktivnosti. Banke i bankarski sektor su u tome ključan partner na evropskom, regionalnom i nacionalnom nivou.

U tom duhu, i dvobroj našeg časopisa koji je pred vama nastoji da izvrsnim priložima naših kolega autora da doprinos aktuelnim pitanjima obrađujući različite aspekte i faktore konkurentnosti kao paradigme koja je obeležila prethodni period: od uvodnog govora guvernera Narodne banke Srbije na Skupštini Udruženja banaka Srbije, preko analiza kvaliteta aktive bankarskog sektora u Srbiji, uloge veštačke inteligencije i poreza na dodatu vrednost u bankarstvu, do regionalnih inicijativa, kao što su regionalni okvir za taksonomije održivog finansiranja i uloga poznatih finansijskih institucija iz Italije koje odnedavno posluju i u Srbiji. Verujemo da će ove analize i predstavljanja aktuelnosti i budućih okvira podstaći vaše ideje, kreativnost, inovativnost i stvaralaštvo tako što ćete ostati ili postati naš redovni čitalac, saradnik i kolega.

Urednik

Dr Sladjana Sredojević



INTRODUCTORY SPEECH

Slađana Sredojević, PhD
Editor

Dear readers, contributors of Bankarstvo Journal and dear colleagues,

Achieving and preserving the competitiveness of the economy in the face of significant global changes is a paradigm that has marked the recent period. We have witnessed numerous reference reports and international analyses on the achievements made so far in relevant areas which are important for investor confidence, qualitative development of the economy and strengthening the general level of well-being of citizens and society, spanning in scope from European, regional to national. Here we featured some of those that marked the period.

The 2024 EU Competitiveness: Looking Ahead report by Mario Draghi, former President of the European Central Bank, and the Much More Than a Market report by Enrico Letta, former Prime Minister of Italy, both detail the gap in European competitiveness compared to the United States and China. In this regard, they point to significant strategic risks that require the greatest attention in the next medium-term period, such as: the realization of the green transition - the Green Deal for 2025, the accelerated aging of the population, rising defence costs, the demand for sources of financing for the European economy, deglobalisation, rigid regulation and administration as the main obstacles to the development of innovative technology in Europe.

Therefore, the new composition of the European Commission and the European Parliament for the next medium-term period indicate possible strategic lines of action, such as:

1. The need to strengthen Europe's competitiveness through the promotion of innovation, an efficient single market, and a trade and fiscal policy that would ensure a level playing field and autonomy. It also includes an increase in productivity, which should take place in the direction of education, improving the competencies and skills of the workforce.
2. Decarbonisation and sustainable business – the further implementation of all adopted regulations, taxonomies, directives (SFDR), etc. Also, working on open issues such as: Green bonds (whether they will work or just function as a compliance centre), the role of small and medium-sized enterprises, and the obligation to report on the implementation of ESG factors.
3. Fairness/Cohesion/Convergence – EU funds are disbursed to achieve cohesion, balanced regional development and efficient spending of public assets and funds. Integration also applies to the EU's external borders, and accordingly, on 8 November 2023, the European Commission adopted the Growth Plan for the Western Balkans, with the aim of integrating partners from the Western Balkans into the EU single market, improving regional economic cooperation, deepening EU-related reforms, and increasing pre-accession funding in order to accelerate the socio-economic harmonisation of the Western Balkans with the EU.

4. Strengthening security and defence capacities for independence and resilience – in periods of global crises, it has been noted that Europe and its companies are highly dependent on others in several forms: energy from Russia, raw materials and production from China, and security and political influence from the United States. Therefore, it is necessary to have production and not to be economically and politically dependent on others.

Both implicitly and explicitly, in the context of these strategic pillars, banks are invited to finance such objectives and sectors, including possibly certain parts of the defence supply chain.

The OECD has prepared and published the Western Balkans Competitiveness Outlook 2024, as well as the Western Balkans Competitiveness Data Platform. The assessed competitiveness dimensions – measured through public policies and their performance – as well as trends and comparisons of the performance of the Western Balkans indicate that, in the fields of infrastructure and digitalisation, achievements are relevant, while on progress was visibly lower in the domain of skills, the green agenda and business environment. Recommendations have been made to further strengthen the competitiveness of the region through:

- 1 - The need to strengthen the education sector in order to acquire knowledge and skills that are aligned with the future needs of the labour market;
- 2 - Strengthening efforts towards decarbonisation and sustainable economic growth;
- 3 - Removing hurdles that prevent equal opportunities for companies.

Also, the Assessment of Sustainable Finance in Western Balkans: Prospects for Sustainable Finance Taxonomy report, which was created as a result of an external assessment of activities in the field of sustainable finance by the Regional Cooperation Council (RCC), recognises the area of sustainable finance as an aspect of competitiveness and importance for the Serbian banking sector at several levels. As an example of good practice in the regional context, the report cites successful cooperation between banks, the ASB and the IFC over the past three years within the IFC ESG Integrated programme, and in particular notes the joint work on the Guidelines for Strengthening Banks' Capacity to Implement ESG and Sustainable Finance Policies and the activities to educate and support banks for the introduction of ESG systems.

The national level - finally, at the national level, the improvement of the long-term state rating from the status of non-investment "BB+", to the investment "BBB-", which was assessed and published at the beginning of October 2024 by the rating agency Standard and Poor's to improve the competitiveness of the national economy, supports the current topic of a new important global paradigm - reaching and strengthening competitiveness.

Each of these reviews, analyses and reports points to the importance of further investment in new competencies, knowledge and skills of current and future employees, sustainable business, appropriate models of digitalisation and the implementation of artificial intelligence, as generators of new innovations and productivity growth. Banks and the banking sector are a key partner in this at the European, regional and national levels.

In this spirit, the double issue of our Journal that is in front of you now strives to contribute to current issues with excellent contributions by our fellow authors by addressing various aspects and factors of competitiveness as a paradigm that marked the previous period: from the introductory speech of the Governor of the National Bank of Serbia at the Assembly of the Association of Serbian Banks, through analyses of the quality of assets of the banking sector in Serbia, the role of artificial intelligence and value added tax in banking, to regional initiatives, such as the regional framework for sustainable finance taxonomies and the role of well-known financial institutions from Italy that have recently begun operating in Serbia. We believe that these analyses and presentations of current affairs and future frameworks will stimulate your ideas, creativity, and innovation by prompting you to become (and stay) our regular reader, collaborator and colleague.

Editor
Sladjana Sredojević, PhD

GODIŠNJA SKUPŠTINA UDRUŽENJA BANAKA SRBIJE

U Beogradu, u prostorijama Udruženja banaka Srbije, 17. juna 2024. godine je održana redovna Godišnja skupština Udruženja banaka Srbije. Na sednici Skupštine je prisustvovalo oko 50 delegata banaka i predstavnika i gostiju iz drugih institucija.

Sednici Skupštine prisustvovala je i dr Jorgovanka Tabaković, guverner Narodne banke Srbije uz obraćanje uvodnim govorom, koji u celosti prenosimo u nastavku.

GOVOR GUVERNERA JORGOVANKE TABAKOVIĆ NA GODIŠNJOJ SKUPŠTINI UDRUŽENJA BANAKA SRBIJE, 17.06.2024. GOD.

Dame i gospodo, draga Marina, poštovane kolege bankari,

Izuzetno mi je zadovoljstvo da vas pozdravim na godišnjoj sednici Skupštine Udruženja banaka Srbije, poslovnog udruženja koje već više od 100 godina doprinosi razvoju bankarskog sektora i modernizaciji finansijskih usluga u Srbiji.

Narodna banka Srbije i Udruženje banaka Srbije čvrstim partnerstvom i saradnjom promovišu transparentnost u radu i koordinaciju međusobnih aktivnosti sa istim ciljem – očuvanjem stabilnosti bankarskog sektora Srbije i jačanjem njegove otpornosti na sve izazove.

Stabilnost finansijskog sistema predstavlja štit od ekonomskih poremećaja i promena, kao i vitalnu kariku na putu ka održivom ekonomskom razvoju. Jačanjem stabilnosti finansijskog sektora gradimo osnovu za dugoročni privredni rast i obezbeđujemo bolji standard svim našim građanima. U tom smislu, postizanje finansijske stabilnosti predstavlja kontinuiran proces. Poverenje, kao centralni element u ovoj ravni, gradimo strateškim upravljanjem rizicima i proaktivnim regulatornim pristupom.

Narodna banka Srbije već duži niz godina uspeva da pravovremenim i adekvatnim odlukama obezbeđuje i cenovnu i finansijsku stabilnost. Iskoristili smo period niske i stabilne inflacije da ojačamo finansijsku stabilnost dovodeći sve parametre na nivoe koji su znatno iznad regulatornog minimuma. Stabilnost finansijskog sistema potvrđena je i tokom poslednje četiri godine koje je obeležila višedimenzionalna kriza bez presedana i koja upravo pokazuje značaj koordinirane monetarne i makroprudencijalne politike.



Zahvaljujući fleksibilnosti našeg monetarnog okvira, neophodno zatezanje monetarnih uslova sprovodili smo postepeno i odmereno ne ugrožavajući stabilnost finansijskog sistema ni u jednom trenutku. Samim tim uspeali smo da inflaciju vratimo na opadajuću putanju i da se u maju, u skladu s našim projekcijama, vrati u granice cilja – na 4,5%. Imajući navedeno u vidu, Izvršni odbor je procenio da su se stvorili uslovi za početak ublažavanja monetarne politike putem smanjenja referentne kamatne stope, čime je posle gotovo godinu dana smanjena referentna kamatna stopa za 25 baznih poena, na nivo od 6,25%. Očekujemo da će inflacija nastaviti da usporava do kraja godine i da će se u narednoj godini kretati oko centralne vrednosti cilja.

Stabilnost deviznog kursa postala je u Srbiji nova realnost. Umesto dopuštanja značajnijih oscilacija, koje su vodile jačanju inflatornih pritisaka, neizvesnosti poslovanja, visokim kursnim razlikama u domaćoj privredi i porastu problematičnih kredita, što je bila karakteristika domaćeg tržišta pre avgusta 2012. godine, od tada pa do danas jedna od osnovnih karakteristika Narodne banke Srbije i ukupnog finansijskog sistema ostaje relativna stabilnost kursa dinara prema evru. Rekordno visok nivo deviznih rezervi, od preko 25 milijardi evra krajem maja, predstavlja bitan faktor povećanja otpornosti naše zemlje na sve potencijalne potrese iz međunarodnog okruženja.

Ekonomska aktivnost je u prvom tromesečju ubrzala na 4,7% međugodišnje, a na nivou godine očekujemo rast od 3,5%. Već od sledeće godine očekujemo njeno dodatno ubrzanje na raspon između 4% i 5%, čemu će doprineti i realizacija investicija u okviru programa „Skok u budućnost – Srbija Ekspo 2027“, smanjeni globalni inflatorni pritisci i povoljniji uslovi finansiranja. Zahvaljujući dobroj opštoj ekonomskoj situaciji u zemlji, značajan broj banaka očekuje rast kredita i privredi i stanovništvu ove i sledeće godine od preko 5%, što su izneli kao očekivanja u našoj poslednjoj anketi o kreditnoj aktivnosti. O postignutom poverenju nesumnjivo govore i rast dinarske i devizne štednje i njihovi rekordni nivoi – sa ispod 18 milijardi dinara krajem 2012. na preko 159 milijardi dinara, koliko trenutno iznosi dinarska štednja, odnosno sa 8,3 milijarde evra na 14,9 milijardi evra devizne štednje.

Svi podaci pokazuju da smo, uprkos brojnim izazovima i rizicima kojima smo kao mala i otvorena ekonomija bili izloženi u proteklom periodu, očuvali i dodatno ojačali stabilnost bankarskog sektora, što je prepoznato od strane međunarodnih investitora i rejting agencija. Agencija Standard & Poor's je u aprilu 2024. godine povećala izglede Srbije za dobijanje kreditnog rejtinga investicionog ranga sa stabilnih na pozitivne, odnosno na samo pola koraka od investicionog ranga.

Kontinuiranom posvećenošću i proaktivnim pristupom Narodne banke Srbije, uz konstruktivnu saradnju bankarskog sektora, stvorili smo regulatorne pretpostavke za odobravanje brojnih olakšica u otplati kredita privrede i građana, olakšali smo građanima pristup bankarskom finansiranju i unapredili zaštitu interesa korisnika finansijskih usluga. Sve vreme govorim da su nam i uspesi zajednički, jer mi to bez poslovnih banaka ne bismo mogli da uradimo.

Stoga, kao rezultat svih preduzetih aktivnosti, bankarski sektor u Republici Srbiji ostao je stabilan, visoko likvidan i profitabilan. Svi relevantni pokazatelji poslovanja znatno su iznad propisanih minimalnih vrednosti.

Finansijski sistem Republike Srbije karakteriše izrazita bankocentričnost: poslovne banke su dominantni tržišni učesnici, sa učešćem od oko 90%. Neto aktiva bankarskog sektora kontinuirano raste i dostigla je 6.050 milijardi dinara (51,7 milijardi evra), što je činilo 74% bruto domaćeg proizvoda u aprilu 2024. godine. Na kraju marta 2024. godine, pokazatelj adekvatnosti kapitala na nivou bankarskog sektora iznosio je skoro 22%, uz povoljnu strukturu kapitala. Likvidnost bankarskog sektora takođe je na veoma visokom nivou, a vrednosti svih relevantnih pokazatelja konstantno se kreću znatno iznad propisanih minimalnih vrednosti. Pomenuću još i da će od juna 2024. godine banke u Srbiji biti dužne da izračunavaju i održavaju pokazatelj neto stabilnih izvora finansiranja (NSFR po Bazel III standardima). Pored usklađivanja domaće regulative s propisima koji važe u Evropskoj uniji, cilj uvođenja ovog pokazatelja jeste jačanje strukturne likvidnosti banaka.

Ipak, sve vreme smo mislili i o našim građanima i o efektu viših kamatnih stopa na njihov životni standard. Usvajali smo Odluku o privremenim merama za banke koje se odnose na stambene kredite fizičkim licima. Donošenjem ove privremene mere Narodna banka Srbije je još jednom pokazala odgovornost i preventivno delovala radi očuvanja stabilnosti finansijskog sistema u neizvesnim okolnostima promenljivih kamatnih stopa, umesto da se čeka materijalizacija negativnih efekata i rast problematičnih kredita, kada bi svaka reakcija bila iznuđena i ograničenog dometa. Da su ciljevi mere ostvareni, govori činjenica da učešće problematičnih kredita u segmentu stambenih kredita ne samo da nije povećano nego je dodatno smanjeno od uvođenja mere i u aprilu iznosi 1,6%.

S tim u vezi, ono što je najvažnije istaći jeste da smo, zahvaljujući aktivnim naporima banaka na upravljanju problematičnim kreditima strateški podržanim od strane Narodne banke i Vlade Republike Srbije, uspjeli da udeo problematičnih kredita održimo na istorijskom minimumu.

Takođe, iskoristila bih priliku da naglasim i da je emitovana prva emisija dugoročnih MREL obveznica, što predstavlja prvu emisiju ovakvih obveznica u regionu zapadnog Balkana. Pomenuta obveznica emitovana je u dinarima, čime se dodatno doprinosi ostvarenju ciljeva postavljenih Strategijom dinarizacije finansijskog sistema Republike Srbije. Pored toga, ovim obveznicama će se trgovati na Beogradskoj berzi, što će doprineti razvoju domaćeg tržišta kapitala.

Narodna banka Srbije pažljivo prati i analizira trendove i na domaćem, i na međunarodnom tržištu, nastavlja da unapređuje regulatorni okvir za banke radi stalnog kreiranja najpovoljnijeg ambijenta u ovoj sferi i spremni smo da u slučaju potrebe preventivno delujemo kako bi rizici po finansijsku stabilnost bili svedeni na najmanju moguću meru.

Zajedničkim naporima uspostavili smo regulatorni okvir za banke ekvivalentan onom koji se primenjuje u Evropskoj uniji. Narodna banka Srbije je, zajedno s bankama u Srbiji, svojim delovanjem obezbedila sve neophodne uslove za zdrav i stabilan bankarski sektor, koji finansira domaću ekonomsku aktivnost i pruža savremene finansijske usluge. Postignuti rezultati svedoče da smo na pravom putu, te i u narednom periodu ostajemo posvećeni pružanju podrške modernizaciji bankarskih usluga, primeni tehnoloških inovacija u poslovanju, razvoju finansijske infrastrukture i finansijskoj inkluziji, što sve zajedno doprinosi rastu naše privrede i boljem standardu građana.

Podrazumevamo nastavak uspešne i kvalitetne saradnje sa Udruženjem banaka Srbije, na čelu s Marinom Papadakis, i uvereni smo da će Udruženje svojim inicijativama i inovativnim pristupom u saradnji s Narodnom bankom Srbije doprinositi daljem razvoju bankarskog sektora Republike Srbije i unapređenju finansijskih usluga privredi i stanovništvu, uz primenu najsavremenijih pristupa upravljanju rizicima.

Srdačno vas pozdravljam i želim vam uspešnu godišnju Skupštinu Udruženja banaka Srbije.

ANNUAL ASSEMBLY OF THE ASSOCIATION OF SERBIAN BANKS

In Belgrade, in the premises of the Association of Serbian Banks, on 17 June 2024, the regular Annual Assembly of the Association of Serbian Banks was held. About 50 bank delegates and representatives and guests from other institutions attended the Assembly session.

The session of the Assembly was also attended by Jorgovanka Tabaković, PhD, Governor of the National Bank of Serbia, who addressed the Assembly with an opening speech we deliver here in full.

GOVERNOR JORGOVANKA TABAKOVIĆ'S SPEECH AT THE ANNUAL ASSEMBLY OF THE ASSOCIATION OF BANKS OF SERBIA 17.06.2024

Ladies and gentlemen, dear Marina, respected fellow bankers,

It gives me great pleasure to welcome you to the annual session of the Assembly of the Association of Serbian Banks, a business association that has been contributing to the development of the banking sector and the modernization of financial services in Serbia for more than 100 years.

The National Bank of Serbia and the Association of Serbian Banks promote transparency in their work and coordination of mutual activities with the same goal - preserving the stability of the banking sector of Serbia and strengthening its resistance to all challenges through strong partnership and cooperation.

The stability of the financial system represents a shield against economic disturbances and changes, as well as a vital link on the way to sustainable economic development. By strengthening the stability of the financial sector, we build the basis for long-term economic growth and provide a better standard for all our citizens. In this sense, achieving financial stability is a continuous process. Trust, as a central element at this level, is built through strategic risk management and a proactive regulatory approach.

For many years, the National Bank of Serbia has managed to ensure price and financial stability through timely and adequate decisions. We used the period of low and stable inflation to strengthen financial stability by bringing all parameters to levels well above the regulatory minimum. The stability of the financial system was also confirmed during the last four years, which were marked by an unprecedented multidimensional crisis, which shows the importance of a coordinated monetary and macroprudential policy.



Thanks to the flexibility of our monetary framework, we carried out the necessary tightening of monetary conditions gradually and measuredly without jeopardizing the stability of the financial system at any moment. With this, we managed to return inflation to a downward path and in May, in accordance with our projections, return to the target range - to 4.5%. Bearing the above in mind, the Executive Board estimated that the conditions have been created for the beginning of easing the monetary policy through the reduction of the reference interest rate, which after almost a year reduced the reference interest rate by 25 basis points, to the level of 6.25%. We expect that inflation will continue to slow until the end of the year and that in the coming year it will move around the central value of the target.

Exchange rate stability has become a new reality in Serbia. Instead of allowing more significant oscillations, which led to the strengthening of inflationary pressures, business uncertainty, high exchange rate differences in the domestic economy and the increase in non-performing loans, which was a characteristic of the domestic market before August 2012, from then until today one of the basic characteristics of the National Bank of Serbia and the overall financial system, the relative stability of the dinar exchange rate against the euro remains. The record high level of foreign exchange reserves, of over 25 billion euros at the end of May, is an important factor in increasing the resistance of our country to all potential earthquakes from the international environment.

Economic activity accelerated to 4.7% year-on-year in the first quarter, and we expect growth of 3.5% for the year. As of next year, we expect its additional acceleration to a range between 4% and 5%, which will be contributed to by the realization of investments within the "Leap into the Future - Serbia Expo 2027" program, reduced global inflationary pressures and more favorable financing conditions. Thanks to the good general economic situation in the country, a significant number of banks expect a growth in loans to the economy and the population of over 5% this year and next, which they expressed as expectations in our last survey on credit activity. The growth of dinar and foreign currency savings and their record levels - from below 18 billion dinars at the end of 2012 to over 159 billion dinars, which is the current amount of dinar savings, that is, from 8.3 billion euros to 14.9 billion euros in foreign currency - undoubtedly speak of the trust achieved savings.

All data show that, despite the numerous challenges and risks to which we, as a small and open economy, were exposed in the past period, we preserved and additionally strengthened the stability of the banking sector, which was recognized by international investors and rating agencies. In April 2024, the Standard & Poor's agency increased Serbia's prospects for obtaining an investment grade credit rating from stable to positive, that is, to only half a step from investment grade.

With the continued dedication and proactive approach of the National Bank of Serbia, along with the constructive cooperation of the banking sector, we have created regulatory prerequisites for the approval of numerous reliefs in the repayment of loans to businesses and citizens, we have made it easier for citizens to access bank financing and improved the protection of the interests of users of financial services. I always say that our successes are shared, because we would not be able to do it without commercial banks.

Therefore, as a result of all the activities undertaken, the banking sector in the Republic of Serbia remained stable, highly liquid and profitable. All relevant business indicators are significantly above the prescribed minimum values.

The financial system of the Republic of Serbia is characterized by a distinct bank-centricity: commercial banks are the dominant market participants, with a share of around 90%. The net assets of the banking sector are continuously growing and reached 6,050 billion dinars (51.7 billion euros), which accounted for 74% of the gross domestic product in April 2024. At the end of March 2024, the capital adequacy indicator at the level of the banking sector was almost 22%, with a favorable capital structure. The liquidity of the banking sector is also at a very high level, and the values of all relevant indicators are constantly moving significantly above the prescribed minimum values. I will also mention that from June 2024, banks in Serbia will be required to calculate and maintain the indicator of net stable sources of financing (NSFR according to Basel III standards). In addition to harmonizing domestic regulations with those in force in the European Union, the goal of introducing this indicator is to strengthen the structural liquidity of banks.

However, we were always thinking about our citizens and the effect of higher interest rates on their living standards. We adopted the Decision on temporary measures for banks related to housing loans to natural persons. By adopting this temporary measure, the National Bank of Serbia once again showed responsibility and acted preventively to preserve the stability of the financial system in the uncertain circumstances of fluctuating interest rates, instead of waiting for the materialization of negative effects and the growth of problem loans, when any reaction would be forced and of limited scope. The fact that the share of problem loans in the segment of housing loans has not only not increased, but has further decreased since the introduction of the measure also amounts to 1.6% in April shows that the goals of the measure have been achieved.

In this regard, the most important thing to emphasize is that, thanks to the banks' active efforts to manage problem loans, strategically supported by the National Bank and the Government of the Republic of Serbia, we managed to keep the share of problem loans at a historic minimum.

Also, I would like to use the opportunity to emphasize that the first issue of long-term MREL bonds was issued, which represents the first issue of such bonds in the Western Balkans region. The mentioned bond was issued in dinars, which additionally contributes to the achievement of the goals set by the Strategy of Dinarization of the Financial System of the Republic of Serbia. In addition, these bonds will be traded on the Belgrade Stock Exchange, which will contribute to the development of the domestic capital market.

The National Bank of Serbia carefully monitors and analyzes trends on both the domestic and international markets, continues to improve the regulatory framework for banks in order to constantly create the most favorable environment in this sphere, and we are ready to act preventively, if necessary, so that the risks to financial stability are reduced to the smallest possible measure.

Through joint efforts, we have established a regulatory framework for banks equivalent to that applied in the European Union. The National Bank of Serbia, together with banks in Serbia, has provided all the necessary conditions for a healthy and stable banking sector, which finances domestic economic activity and provides modern financial services. The achieved results prove that we are on the right track, and in the coming period we remain committed to providing support for the modernization of banking services, the application of technological innovations in business, the development of financial infrastructure and financial inclusion, which all together contribute to the growth of our economy and a better standard of citizens.

We understand the continuation of successful and high-quality cooperation with the Association of Serbian Banks, headed by Marina Papadakis, and we are convinced that the Association, with its initiatives and innovative approach in cooperation with the National Bank of Serbia, will contribute to the further development of the banking sector of the Republic of Serbia and the improvement of financial services to the economy and the population, with application of the most modern approaches to risk management.

I warmly greet you and wish you a successful annual Assembly of the Association of Serbian Banks.

Datum prijema: 10.04.2024. god.
Datum prihvatanja: 22.05.2024. god.

DOI: 10.5937/bankarstvo2403018L

ANALIZA KVALITETA AKTIVE BANKARSKOG SEKTORA U SRBIJI

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Rezime: Istraživanje kvaliteta aktive bankarskog sektora je vrlo izazovno, kontinuirano aktuelno, složeno i značajno. Kvalitet aktive u značajnoj meri utiče na ukupne performanse bankarskog sektora. Otuda je neophodno što efikasnije upravljati kvalitetom aktive bankarskog sektora. Imajući to u vidu, u ovom radu se analizira dinamika kvaliteta aktive bankarskog sektora u Srbiji na bazi LMAW-DNMA metoda. Prema dobijenim rezultatima LMAW-DNMA metoda najbolji kvalitet aktive bankarskog sektora u Srbiji ostvaren je u 2013. godine, zatim u 2011, 2016, 2012 i 2014. godini. Na nepovoljan kvalitet aktive bankarskog sektora u Srbiji u periodu 2019-2021. godine uticala je pandemija korona virusa Covid-19, tako što je prouzrokovala pad privrednih, a time i kreditnih aktivnosti, i u velikoj meri prolongiranje otplate kreditnih obaveza. U 2022. i 2023. godini zabeleženo je neznatno poboljšanje kvaliteta aktive bankarskog sektora u Srbiji. Dakle, neophodno je, između ostalog, što efikasnije upravljati kreditnim rizicima i sledstveno tome, vršiti adekvatnu distribuciju raspoloživih kredita na privredu, sektore i stanovništvo u cilju ostvarenja ciljnog kvaliteta aktive bankarskog sektora u Srbiji.

Ključne reči: problematični krediti, distribucija raspoloživog kredita, bankarski sektor, Srbija

JEL klasifikacija: D40, G21

Uvod

Problematika analize kvaliteta aktive bankarskog sektora vrlo je značajna, kontinuirano aktuelna, složena i izazovna. Iz razloga što kvalitet aktive bitno utiče na performanse bankarskog sektora. Adekvatnim upravljanjem kvalitetom aktive može se u znatnoj meri uticati na ostvarenje ciljnih performansi bankarskog sektora. Polazeći od iznetog, u ovom radu se istražuje dinamika kvaliteta aktive bankarskog sektora u Srbiji na bazi LMAW-DNMA metoda. U tome se manifestuje predmet i cilj ovog rada.

Literatura posvećena razvoju i značaju primene DEA (Data Envelopment Analysis) modela u analizi efikasnosti različitih entiteta vrlo je bogata (Hwang & Yoon, 1981, 1995; Andersen & Petersen, 1993; Banker et al., 1984; Chen et al., 2021; Chang & Wang, 2020; Guo & Cai, 2020; Lee et al., 2011; Lin, 2020; Pendharkar, 2021; Tone, 2002; Podinovski Podinovski & Bouzdine-Chameeva, 2021; Bouzdine-Chameeva et al., 2021; Rostamzadehet al., 2021; Fenyves & Tarnóczy, 2020; Tsai et al., 2021; Stević & Brković, 2020; Stević et al., 2020; Saaty, 2008; Peykani et al., 2022a,b). Vrlo uspešno se DEA modeli primenjuju i u analizi efikasnosti finansijskih institucija (banaka, osiguravajućih kompanija i drugih) (Savic et al., 2012; Maletić et al., 2013; Radojčić et al., 2018; Cvetkoska & Savic, 2017; Cvetkoska & Cikovic, 2020; Cvetkovska et al., 2021; Lukic et al., 2017; Lukic & Hadrovic Zekic, 2019; Lukić, 2018a,b, 2021, 2022a,b, 2023a,b,c,d,e; Milenković et al., 2022). Prilikom analize finansijskih performansi (likvidnosti, solventnost i profitabilnosti) i efikasnosti banaka sve se više primenjuju, integralno ili pojedinačno, i različiti metodi višekriterijumskog odlučivanja (MCDM – Multi-Criteria Decision Making), uključujući LMAW-DNMA metodu (Ünlü et al., 2022; Ali et al., 2022, Lukic, 2022a,b, 2023f; Demir, 2022; Ecer & Pamucar, 2022), iz razloga što metodi višekriterijumskog odlučivanja u cilju dobijanja što realnije procene istovremeno integrišu nekoliko indikatora (kriterijuma) performansi bankarskog sektora. Sva relevantna literatura u ovom radu se koristi kao teorijsko-metodološka i empirijska osnova za analizu dinamike kvaliteta aktive bankarskog sektora u Srbiji pomoću LMAW-DNMA metode.

Osnovna istraživačka hipoteza u ovom radu je bazirana na činjenici da je kvalitet aktive značajna determinata performansi bankarskog sektora (u konkretnom slučaju u Srbiji). U funkciji ostvarenja ciljnih performansi bankarskog sektora neophodno je što efikasnije upravljati kvalitetom aktive, tj. kreditnim rizikom.

U metodološkom smislu te reči, u tome značajnu ulogu ima primena LMAW-DNMA metoda. Zato što se u analizi, u cilju što realnije evaluacije, uključuju istovremeno nekoliko indikatora (kriterijuma) kvaliteta aktive bankarskog sektora, što nije slučaj sa racio analizom.

Empirijski podaci potrebni za istraživanje kvaliteta aktive bankarskog sektora u Srbiji su prikupljeni od Narodne banke Srbije. Oni su „proizvedeni“ u skladu sa relevantnim međunarodnim standardima (Međunarodni standardi finansijskog izveštavanja, Bazelski standardi). To omogućuje bez ikakvih ograničenja komparaciju kvaliteta aktive bankarskog sektora u Srbiji sa drugim uporedivim zemljama ukoliko se vrše slična istraživanja. No, koliko je nama poznato u literaturi ne postoje slična istraživanja za druge zemlje, te se zbog značaja preporučuje da se vrše.

1. Metodologija

U daljim izlaganjima tretirane problematike u ovom radu ukratko ćemo se osvrnuti na karakteristike LMAW i DNMA metoda. (Ovaj tekst je u celini identičan tekstu u radu „Analiza dinamičke adekvatnosti kapitala bankarskog sektora u Srbiji“ koji je publikovan u časopisu Bankarstvo, 2023, vol. 52, broj 4, čiji je autor prof. dr Radojko Lukić, jer se koristi ista metodologija istraživanja samo primenjena na slučaj analize kvaliteta aktive bankarskog sektora u Srbiji.)

LMAW metoda

LMAW (Logarithm Methodology of Additive Weights) metoda je najnovija metoda koja se koristi za izračunavanje težina kriterijuma i rangiranje alternativa (Liao, & Wu, 2020; Demir, 2022). Ona se odvija kroz sledeće korake: m alternativa $A = \{A_1, A_2, \dots, A_m\}$ se vrednuju u poređenju sa n kriterijuma $C = \{C_1, C_2, \dots, C_n\}$ učešćem k eksperta $E = \{E_1, E_2, \dots, E_k\}$ prema unapred definisanoj lingvističkoj skali (Pamućar et al, 2021).

Korak 1: Određivanje težinskih koeficijenata kriterijuma

Eksperti $E = \{E_1, E_2, \dots, E_k\}$ određuju prioritete kriterijumima $C = \{C_1, C_2, \dots, C_n\}$ u odnosu na prethodno definisane vrednosti lingvističke skale. Pri tom dodeljuju veću vrednost kriterijumu veće značajnosti i manju vrednost kriterijumu manje važnosti na lingvističkoj skali. Uzgred, dobija se vektor prioriteta. Oznaka γ_{cn}^e predstavlja vrednost lingvističke skale koju eksperte $e (1 \leq e \leq k)$ dodeljuje kriterijumu $C_t (1 \leq t \leq n)$

Korak 1.1: Definisanje apsolutne anti-idealne tačke γ_{AIP}

Apsolutna idealna tačka treba da bude manja od najmanje vrednosti u vektoru prioriteta. To se izračunava prema jednačini:

$$\gamma_{AIP} = \frac{\gamma_{min}^e}{S}$$

gde je γ_{min}^e minimalna vrednost vektora prioriteta i S treba da bude veće od bazne logaritamske funkcije. U slučaju korišćenja funkcije Ln, vrednost S se može izabrati kao 3.

Korak 1.2: Određivanje odnosa između vektora prioriteta i apsolutne anti-idealne tačke

Odnos između vektora prioriteta i apsolutne anti-idealne tačke izračunava se korišćenjem sledeće jednačine:

$$n_{cn}^e = \frac{\gamma_{cn}^e}{\gamma_{AIP}} \quad (1)$$

Tako da se relacioni vektor $R^e = (n_{c1}^e, n_{c2}^e, \dots, n_{cn}^e)$ dobija. Pri čemu n_{cn}^e predstavlja vrednost realacionog vektora izvedene iz prethodne jednačine, i R^e reprezentuje relacioni vektor $(1 \leq e \leq k)$.

Korak 1.3: Određivanje vektora težinskih koeficijenata

Vektor težinskih koeficijenata $w = (w_1, w_2, \dots, w_n)^T$ se izračunava od strane eksperta $e(1 \leq e \leq k)$ primenom sledeće jednačine:

$$w_j^e = \frac{\log_A(n_{cn}^e)}{\log_A(\prod_{j=1}^n n_{cn}^e)}, A > 1 \quad (2)$$

gde w_j^e predstavlja težinske koeficijente dobijene prema ocenama eksperta e^{th} i n_{cn}^e elemente relacionog vektora R . Dobijene vrednosti za težinske koeficijente moraju ispunjavati uslov da je $\sum_{j=1}^n w_j^e = 1$.

Primenom Bonferroni agregatora prikazanog u sledećoj jednačini, određuje se agregirani vektor težinskih koeficijenata $w = (w_1, w_2, \dots, w_n)^T$:

$$w_j = \left(\frac{1}{k \cdot (k-1)} \cdot \sum_{x=1}^k (w_j^{(x)})^p \cdot \sum_{\substack{y=1 \\ y \neq x}}^k (w_{ij}^{(y)})^q \right)^{\frac{1}{p+q}} \quad (3)$$

Vrednost p i q su parametri stabilizacije i $p, q \geq 0$. Rezultirajući težinski koeficijenti treba da ispune uslov da je $\sum_{j=1}^n w_j = 1$.

DNMA metod

DNMA (Double Normalization-based Multiple Aggregation) metoda je novija metoda za prikazivanje alternativa (Demir, 2022). Koriste se dve različite normalizovane (linernana i vektorska) tehnike, kao i tri različite funkcije spajanja (puna kompenzacija – CCM, nekompenzacija – UCM i nepotpuna kompenzacija – ICM). Koraci primene ove metode su sledeći (Liao & Wu, 2020; Ecer, 2020):

Korak 1: Normalizovana matrica odlučivanja

Elementi matrice odlučivanja normalizuju se sa lineranom ($\hat{x}_{ij}^{1N}$) normalizacijom primenom sledeće jednačine:

$$\hat{x}_{ij}^{1N} = 1 - \frac{|x^{ij} - r_j|}{\max\{\max_i x^{ij}, r_j\} - \min\{\min_i x^{ij}, r_j\}} \quad (4)$$

Vektor ($\hat{x}_{ij}^{2N}$) je normalizovan sa korišćenjem sledeće jednačine:

$$\hat{x}_{ij}^{2N} = 1 - \frac{|x^{ij} - r_j|}{\sqrt{\sum_{i=1}^m (x^{ij})^2 + (r_j)^2}} \quad (5)$$

Vrednost r_j je ciljna vrednost za c_j kriterijum i smatra se kao $\max_i x^{ij}$ za korisne $\min_i x^{ij}$ za troškovne kriterijume.

Korak 2: Određivanje težine kriterijuma

Ovaj korak se sastoji od tri faze:

Korak 2.1: U ovoj fazi, standardna devijacija (σ_j) za kriterijum c_j se određuje sa sledećom jednačinom gde je m broj alternativa:

$$\sigma_j = \sqrt{\frac{\sum_{i=1}^m \left(\frac{x^{ij}}{\max_i x^{ij}} - \frac{1}{m} \sum_{i=1}^m \left(\frac{x^{ij}}{\max_i x^{ij}} \right) \right)^2}{m}} \quad (6)$$

Korak 2.2: Vrednosti standardne devijacije izračunate za kriterijume se normalizuju sa sledećom jednačinom:

$$w_j^\sigma = \frac{\sigma_j}{\sum_{i=1}^n \sigma_j} \quad (7)$$

Korak 2.3: Konačno, težine se prilagođavaju sa sledećom jednačinom:

$$\hat{w}_j = \frac{\sqrt{w_j^\sigma \cdot w_j}}{\sum_{i=1}^n \sqrt{w_j^\sigma \cdot w_j}} \quad (8)$$

Korak 3: Izračunavanje modela agregacije

Tri funkcije agregacije (CCM, UCM i ICM) se izračunavaju posebno za svaku alternativu.

CCM (model kompletne kompenzacije) se izračunava primenom sledeće jednačine:

$$u_1(a_i) = \sum_{j=1}^n \frac{\hat{w}_j \cdot \hat{x}_{ij}^{1N}}{\max_i \hat{x}_{ij}^{1N}} \quad (9)$$

UCM (nekompenzacioni model) se izračunava pomoću sledeće jednačine:

$$u_2(a_i) = \max_j \hat{w}_j \left(\frac{1 - \hat{x}_{ij}^{1N}}{\max_i \hat{x}_{ij}^{1N}} \right) \quad (10)$$

ICM (nepotpuni kompenzacioni model) se izračunava korišćenjem sledeće jednačine:

$$u_3(a_i) = \prod_{j=1}^n \left(\frac{\hat{x}_{ij}^{2N}}{\max_i \hat{x}_{ij}^{2N}} \right)^{\hat{w}_j} \quad (11)$$

Korak 4: Integracija vrednosti korisnosti

Izračunate funkcije korisnosti se integrišu sa sledećom jednačinom korišćenjem Euklidskog (Euclidean) principa udaljenosti:

$$DN_i = w_1 \sqrt{\varphi \left(\frac{u_1(a_i)}{\max u_1(a_i)} \right)^2 + (1-\varphi) \left(\frac{m-r_1(a_i)+1}{m} \right)^2} - w_2 \sqrt{\varphi \left(\frac{u_2(a_i)}{\max u_2(a_i)} \right)^2 + (1-\varphi) \left(\frac{r_2(a_i)}{m} \right)^2} + w_3 \sqrt{\varphi \left(\frac{u_3(a_i)}{\max u_3(a_i)} \right)^2 + (1-\varphi) \left(\frac{m-r_3(a_i)+1}{m} \right)^2} \quad (12)$$

U ovoj jednačini $r_1(a_i)$, $r_3(a_i)$ a predstavljaju redni broj alternative a_i sortirane prema funkcijama CCM i ICM po opadajućoj vrednosti (prvo veća vrednost). S druge strane, $r_2(a_i)$ pokazuje redni broj u dobijenom redosledu prema rastućoj vrednosti (prvo manja vrednost) za korišćenu funkciju UCM. Oznaka φ je relativni značaj korišćene podređene vrednosti i u rasponu je [0,1]. Smatra se da se može uzeti kao $\varphi=0,5$. Koeficijenti w_1, w_2, w_3 su dobijene težine korišćenih funkcija CCM, UCM i ICM, respektivno. Suma treba da je jednaka $w_1 + w_2 + w_3 = 1$. Prilikom određivanja težine, ako donosilac odluka pridaje značaj širem rasponu performansi alternativa, on može odrediti veću vrednost za w_1 . U slučaju da donosilac odluka nije spreman da rizikuje, tj. da izabere siromašnu alternativu prema nekom kriterijumu, on može dodeliti veću težinu za w_2 . Međutim, donosilac odluka može dodeliti veću težinu za w_3 , ako istovremeno uzima u obzir ukupne performanse i rizik. Najzad, vrednosti DN su sortirane po opadajućoj vrednosti, pri čemu su alternative sa većom vrednošću najbolje.

2. Rezultati i diskusija

U Tabeli 1 su prikazani indikatori kvaliteta aktive bankarskog sektora u Srbiji kao kriterijumi, alternative (posmatrane godine) i originalni inicijalni podaci. Podaci su dati za period 2008 – 2023.

Tabela 1 - Indikatori kvaliteta aktive bankarskog sektora u Srbiji (podaci u tabeli su u procentima), 2008 -

	Problematicni krediti u odnosu na ukupne kredite	Sektorska raspodela ukupnih kredita - Banke	Sektorska raspodela ukupnih kredita - NBS	Sektorska raspodela ukupnih kredita - Javni sektor	Sektorska raspodela ukupnih kredita - Druge finansijske organizacije	Sektorska raspodela ukupnih kredita - Privreda	Sektorska raspodela ukupnih kredita - Stanovništvo i NIPUS (neprofitne institucije koje pružaju usluge stanovništvu)	Sektorska raspodela ukupnih kredita - Stanovništvo i NIPUS od čega: stambeni krediti	Sektorska raspodela ukupnih kredita - Sektor inostranstvo	Ispravka vrednosti problematičnih kredita u odnosu na bruto problematične kredite	Ispravka vrednosti ukupnih kredita u odnosu na bruto problematične kredite	Ispravka vrednosti ukupnih kredita u odnosu na ukupno bruto kredite
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
A1 - 2008	11,3	1,1	6,6	0,9	0,7	52,4	35,3	13,9	2,8	56,9	73,2	8,2
A2 - 2009	15,7	0,6	10,9	1,7	0,5	53,3	32,2	13,7	0,8	50,9	61,4	9,6
A3 - 2010	16,9	0,1	2,8	3,5	1,2	57	33,3	15,4	2	47,2	53,9	9,1
A4 - 2011	19	0,1	6,5	3,4	1,6	54,9	31,9	15	1,6	51	57	10,8
A5 - 2012	18,6	0,3	2,1	3	1,6	58,2	33	16,1	1,9	50	54,9	10,2
A6 - 2013	21,4	0,3	5,8	2,3	1,6	54,1	34,8	16,8	1,1	50,9	55,8	11,9
A7 - 2014	21,5	0,8	0,4	2,3	0,5	56,3	38,3	18	1,4	54,9	59	12,7
A8 - 2015	21,6	0,1	1,6	1,7	0,7	55,9	39,1	18,1	0,9	62,3	66,8	14,4
A9 - 2016	17	0,5	1,7	1,5	0,9	52,6	41,5	17,9	1,4	67,8	72,9	12,4
A10 - 2017	9,8	0,3	2,1	1,3	0,9	50,5	42,9	16,9	2	58,1	66,8	6,6

A11- 2018	5,7	0,4	0,7	1,1	0,8	50	44,3	16,8	2,6	60,2	78,7	4,5
A12 -2019	4,1	0,4	2,8	1,5	0,8	49,2	43,8	15,8	1,5	61,5	84,2	3,4
A13 -2020	3,7	0,3	1,1	1,6	0,8	49,6	45	16,4	1,6	59	93,4	3,5
A14 -2021	3,6	0	1,5	1,7	0,6	49,3	45	17,4	1,9	56,3	88,5	3,2
A15 -2022	3,0	0,7	3,3	2,2	1,1	47,6	43,2	17,4	2,0	58,1	102,5	3,1
A16 - 2023	3,2	0,2	11,0	2,7	1,0	43,4	39,4	15,5	2,3	60,5	101,0	3,2
Statistic												
N	Valid	16	16	16	16	16	16	16	16	16	16	16
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean	12,2563	,3875	3,8063	2,0250	,9563	52,1438	38,9375	16,3188	1,7375	56,6000	73,1250	7,9250
Median	13,5000	s,3000	2,4500	1,7000	,8500	52,5000	39,2500	16,6000	1,7500	57,5000	69,8500	8,6500
Std. Deviation	7,43998	,29411	3,39027	,78951	,37232	3,93530	4,89420	1,36441	,56318	5,48756	16,57325	3,99775
Minimum	3,00	,00	,40	,90	,50	43,40	31,90	13,70	,80	47,20	53,90	3,10
Maximum	21,60	1,10	11,00	3,50	1,60	58,20	45,00	18,10	2,80	67,80	102,50	14,40

Napomena: Autorova statistika. Podaci za 2023. godinu su dati za IV kvartal.
Izvor: Narodna banka Srbije. Ključni makroprudencijalni indikatori Republike Srbije

U Tabeli 2 je prikazana korelaciona matrica indikatora (kriterijuma) kvaliteta aktive bankarskog sektora u Srbiji

Tabela 2 - Korelacija

Correlations													
		1	2	3	4	5	6	7	8	9	10	11	12
C1	Pirsonova korelacija	1	,001	-,011	,370	,298	,880**	-,721**	,065	-,532*	-,390	-,890**	,977**
	Sig. (2-tailed)		,998	,969	,158	,263	,000	,002	,812	,034	,135	,000	,000
	N	16	16	16	16	16	16	16	16	16	16	16	16
C2	Pirsonova korelacija	,001	1	,114	-,435	-,352	-,009	-,064	-,214	,216	,121	,052	,060
	Sig. (2-tailed)	,998		,675	,092	,181	,974	,815	,427	,421	,655	,849	,824
	N	16	16	16	16	16	16	16	16	16	16	16	16
C3	Pirsonova korelacija	-,011	,114	1	,195	,115	-,265	-,524*	-,731**	-,040	-,261	,035	-,039
	Sig. (2-tailed)	,969	,675		,468	,671	,320	,037	,001	,884	,329	,897	,886
	N	16	16	16	16	16	16	16	16	16	16	16	16
C4	Pirsonova korelacija	,370	-,435	,195	1	,675**	,353	-,588*	-,122	-,118	-,635**	-,342	,230
	Sig. (2-tailed)	,158	,092	,468		,004	,180	,017	,653	,664	,008	,195	,391
	N	16	16	16	16	16	16	16	16	16	16	16	16
C5	Pirsonova korelacija	,298	-,352	,115	,675**	1	,268	-,460	-,093	,040	-,454	-,324	,180
	Sig. (2-tailed)	,263	,181	,671	,004		,315	,073	,733	,883	,078	,221	,504
	N	16	16	16	16	16	16	16	16	16	16	16	16
C6	Pirsonova korelacija	,880**	-,009	-,265	,353	,268	1	-,654**	,010	-,382	-,525*	-,904**	,823**
	Sig. (2-tailed)	,000	,974	,320	,180	,315		,006	,972	,145	,037	,000	,000
	N	16	16	16	16	16	16	16	16	16	16	16	16
C7	Pirsonova korelacija	-,721**	-,064	-,524*	-,588*	-,460	-,654**	1	,570*	,214	,728**	,740**	-,625**
	Sig. (2-tailed)	,002	,815	,037	,017	,073	,006		,021	,425	,001	,001	,010
	N	16	16	16	16	16	16	16	16	16	16	16	16

C8	Pirsonova korelacija	,065	-,214	-,731**	-,122	-,093	,010	,570*	1	-,211	,466	,148	,137
	Sig. (2-tailed)	,812	,427	,001	,653	,733	,972	,021		,433	,069	,584	,612
	N	16	16	16	16	16	16	16	16	16	16	16	16
C9	Pirsonova korelacija	-,532*	,216	-,040	-,118	,040	-,382	,214	-,211	1	,067	,358	-,544*
	Sig. (2-tailed)	,034	,421	,884	,664	,883	,145	,425	,433		,806	,174	,029
	N	16	16	16	16	16	16	16	16	16	16	16	16
C10	Pirsonova korelacija	-,390	,121	-,261	-,635**	-,454	-,525*	,728**	,466	,067	1	,589*	-,203
	Sig. (2-tailed)	,135	,655	,329	,008	,078	,037	,001	,069		,806	,016	,451
	N	16	16	16	16	16	16	16	16	16	16	16	16
C11	Pirsonova korelacija	-,890**	,052	,035	-,342	-,324	-,904**	,740**	,148	,358	,589*	1	-,810**
	Sig. (2-tailed)	,000	,849	,897	,195	,221	,000	,001	,584	,174	,016		,000
	N	16	16	16	16	16	16	16	16	16	16	16	16
C12	Pirsonova korelacija	,977**	,060	-,039	,230	,180	,823**	-,625**	,137	-,544*	-,203	-,810**	1
	Sig. (2-tailed)	,000	,824	,886	,391	,504	,000	,010	,612	,029	,451	,000	
	N	16	16	16	16	16	16	16	16	16	16	16	16
*. Korelacija je značajna na nivou od 0,05 (2-tailed).													
**. Korelacija je značajna na nivou od 0,01 (2-tailed).													

Napomena: Proračun autora na osnovu podataka Tabele 1.

U konkretnom slučaju dakle postoji jaka korelaciona veza između kriterijuma C1 - Problematični krediti u odnosu na ukupne kredite i kriterijuma C6 - Sektorska raspodela ukupnih kredita – Privreda, C7 - Sektorska raspodela ukupnih kredita – Stanovništvo i NIPUS (neprofitne institucije koje pružaju usluge stanovništvu), C9 - Sektorska raspodela ukupnih kredita – Sektor inostranstvo, C11 - Ispravka vrednosti ukupnih kredita u odnosu na bruto problematične kredite i C12 - Ispravka vrednosti ukupnih kredita u odnosu na ukupno bruto kredite. Efikasnom kontrolom ovih indikatora - kriterijuma može se znato uticati na veličinu problematičnih bankarskih kredita u odnosu na ukupne kredite u Srbiji. Efekti toga su poboljšanje kvaliteta aktive bankarskog sektora u Srbiji.

U Tabeli 3. je prikazana procedura utvrđivanja težinskih koeficijenata (pondera) kriterijuma primenom LMAW metode. Na Slici 1. su prikazani težinski koeficijenti kriterijuma.

Tabela 3. Utvrđivanje težinskih koeficijenata kriterijuma primenom LMAW metode

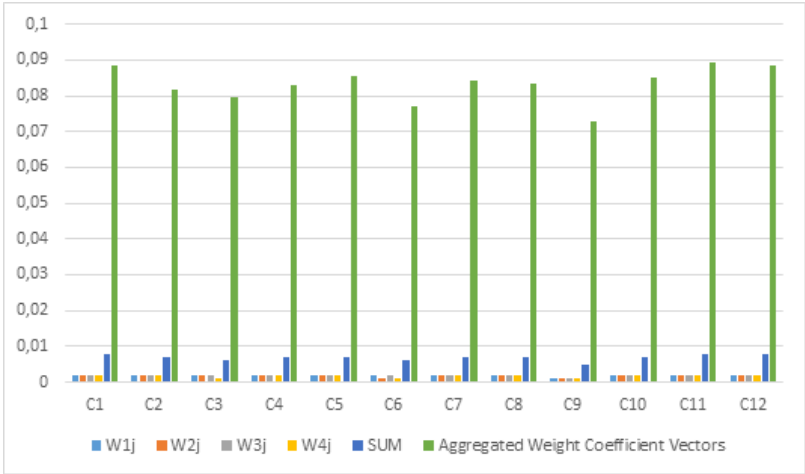
Skala prioriteta		
Lingvističke varijable	Skraćenica	Određivanje prioriteta
Apsolutno nisko	AL	1
Veoma nizak	VL	1,5
Nisko	L	2
Srednje	M	2,5
Jednako	E	3
Srednje visoko	MH	3,5
Visoko	H	4
Veoma visok	VH	4,5
Apsolutno visoko	AH	5

KIND	1	1	1	1	1	1	1	1	1	1	1	1
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
E1	VH	AH	H	E	MH	MH	H	VH	E	H	VH	VH
E2	VH	VH	MH	H	H	MH	AH	AH	L	VH	AH	VH
E3	VH	MH	VH	AH	AH	H	E	E	H	H	VH	AH
E4	AH	E	E	VH	AH	E	AH	H	H	VH	AH	VH

YAIP	0.5											
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C1
R1	9	10	8	6	7	7	8	9	6	8	9	9
R2	9	9	7	8	8	7	10	10	4	9	10	9
R3	9	7	9	10	10	8	6	6	8	8	9	10
R4	10	6	6	9	10	6	10	8	8	9	10	9

Weight Coefficients Vector	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
W1j	0,089	0,093	0,084	0,072	0,078	0,078	0,084	0,089	0,072	0,084	0,089	0,089
W2j	0,087	0,087	0,077	0,083	0,083	0,077	0,092	0,092	0,055	0,087	0,092	0,087
W3j	0,087	0,077	0,087	0,091	0,091	0,082	0,071	0,071	0,082	0,082	0,087	0,091
W4j	0,091	0,071	0,071	0,087	0,091	0,071	0,091	0,082	0,082	0,087	0,091	0,087

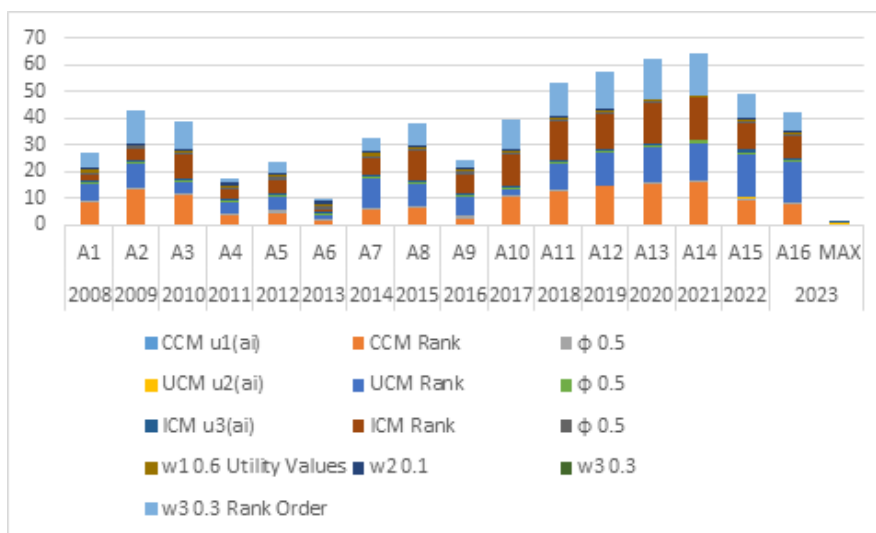
Aggregated Fuzzy Vectors	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
W1j	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,001	0,002	0,002	0,002
W2j	0,002	0,002	0,002	0,002	0,002	0,001	0,002	0,002	0,001	0,002	0,002	0,002
W3j	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,001	0,002	0,002	0,002
W4j	0,002	0,002	0,001	0,002	0,002	0,001	0,002	0,002	0,001	0,002	0,002	0,002
SUM	0,008	0,007	0,006	0,007	0,007	0,006	0,007	0,007	0,005	0,007	0,008	0,008
Aggregated Weight Coefficient Vectors	0,0885	0,0818	0,0797	0,0831	0,0857	0,0772	0,0842	0,0832	0,0727	0,0851	0,0895	0,0885



Slika 1 - Težinski koefijenti kriterijuma
Izvor: Autorova slika

Prema tome, u konkretnom slučaju najznačajniji kriterijum je C11 - Ispravka vrednosti ukupnih kredita u odnosu na bruto problematične kredite. Slede: C1 - Problematicni krediti u odnosu na ukupne kredite, C12 - Ispravka vrednosti ukupnih kredita u odnosu na ukupno bruto kredite, i ostali kriterijumi. Znatno se može poboljšati kvalitet aktive bankarskog sektora u Srbiji efikasnom kontrolom problematičnih kredita, kreditnog rizika.

U Tabelama Aneksa 4 - 10 je prikazana procedura utvrđivanja ranga alternativa pomoću LMAW-DNMA metoda. Na Slici 2. je prikazano rangiranje alternativa.



Slika 2 - Rangiranje alternativa

Izvor: Autorova slika

Dakle, u konkretnom slučaju najbolji kvalitet aktive bankarskog sektora u Srbiji je ostvaren u 2013. god. Zatim u 2011, 2016, 2012, 2014. god., i ostale posmatrane godine. U 2019, 2020 i 2021. godini na kvalitet aktive bankarskog sektora u Srbiji nepovoljno je uticala pandemija korona virusa Covid-19, koja je prouzrokovala pad privrednih, a time i kreditnih aktivnosti, i znatno prolongiranje otplate kreditnih obaveza. U izvesnoj meri je neutralisana primenom elektronskog bankarstva. U 2022 i 2023. godini zabeleženo je izvesno poboljšanje kvaliteta aktive bankarskog sektora u Srbiji. U poslednje vreme u nekoliko navrata povećavana je referentna kamatna stopa u cilju ublažavanja negativnog efekta inflacije, što je svakako uticalo na kvalitet aktive bankarskog sektora u Srbiji. Na kvalitet aktive bankarskog sektora u Srbiji uticali su makroekonomski i mikroekonomski trendovi, tj. geopolitička situacija, privredna aktivnost, investiciona ulaganja, strane direktne investicije, monetarna politika, poreska politika, životni standard stanovništva, i drugi kontrolisani i nekontrolisani faktori. Sve u svemu, u cilju ostvarenja ciljnog kvaliteta aktive bankarskog sektora u Srbiji neophodno je, između ostalog, što efikasnije upravljati kreditnim rizicima i, sledstveno tome, vršiti adekvatnu distribuciju raspoloživih kredita na privredu, sektore i stanovništvo kao korisnike.

Primenjena metodologija istraživanja u ovoj studiji ima izvesna ograničenja u pogledu uporedivosti rezultata sa drugim metodama višekriterijumskog odlučivanja, posebno u slučaju kada se koriste različite metode za utvrđivanje težinskih koeficijenata izabranih kriterijuma.

Zaključak

Istraživanje kvaliteta aktive bankarskog sektora u Srbiji pomoću LMAW-DNMA metoda je pokazalo da je najkvalitetnija aktiva bankarskog sektora u Srbiji bila u 2013. godini. Slede: 2011, 2016, 2012, 2014. godina i ostale posmatrane godine. Na kvalitet aktive bankarskog sektora u Srbiji u periodu 2019-2021. god. uticala je pandemija korona virusa Covid-19, tako što je prouzrokovala pad privrednih, a time i kreditnih aktivnosti, i znatno prolongiranje otplate kreditnih obaveza. Isti tako uticali su i makroekonomski i mikroekonomski trendovi, geopolitička situacija, privredna aktivnost, investiciona ulaganja, strane direktne investicije, monetarna politika, fiskalna politika, razvijenosti tržišta kapitala i novca, životni standard stanovništva itd. Zabeleženo je u 2022 i 2023. godini, zahvaljujući efikasnijim upravljanjem kreditnim rizicima, neznatno poboljšanje kvaliteta aktive bankarskog sektora u Srbiji. I pored toga, neophodno je, između ostalog, u funkciji ostvarenja ciljnog kvaliteta aktive bankarskog sektora u Srbiji, što efikasnije upravljati kreditnim rizicima i, shodno tome, vršiti adekvatnu distribuciju raspoloživih kredita na korisnike (privreda, sektori, stanovništvo).

Literatura

1. Ali, S.M., Hoq, S.M.N., Bari, A.B.M.M., Kabir, G., & Paul, S.K. (2022). Evaluating factors contributing to the failure of information system in the banking industry. *PLoS ONE*, 17(3): e0265674. <https://doi.org/10.1371/journal.pone.0265674>
2. Andersen, P., & Petersen, N.C. (1993). A procedure for ranking efficient units in data envelopment analysis. *Management Science*, 39, 1261-1264.
3. Amini, A., Alinezhad, A., & Yazdipoor, F. (2019). A TOPSIS, VIKOR and DEA integrated evaluation method with belief structure under uncertainty to rank alternatives. *International Journal of Advanced Operations Management*, 11(3), 171-188.
4. Banker, R.D., Charnes, A., & Cooper, W.W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management Science*, 30(9), 1078-1092.
5. Božanić, D., Pamučar, D., Milić, A., Marinković, M., & Komazec, N. (2022). Modification of the Logarithm Methodology of Additive Weights (LMAW) by a Triangular Fuzzy Number and Its Application in Multi-Criteria Decision Making. *Axioms*, 11(3), 89. <https://doi.org/10.3390/axioms11030089>
6. Chang, X., & Wang, X. (2020). Research Performance Evaluation of University Based on Super DEA Model. 2020 IEEE 9th Joint International Information Technology and Artificial Intelligence Conference (ITAIC), 1252-1255. doi: 10.1109/ITAIC49862.2020.9339131
7. Chen, Chunhua, Liu, Haohua, Tang, Lijun & Ren, Jianwei. (2021). A Range Adjusted Measure of Super-Efficiency in Integer-Valued Data Envelopment Analysis with Undesirable Outputs. *Journal of Systems Science and Information*, 9(4), 378-398. <https://doi.org/10.21078/JSSI-2021-378-21>
8. Cvetkoska, V., & Savic, G. (2017). Efficiency of bank branches: Empirical evidence from a two-phase research approach. *Economic Research-Ekonomska istraživanja*, 30(1), 318-333. doi:10.1080/1331677X.2017.1305775
9. Cvetkoska, V., & Cikovic, K.F. (2020). Assessing the relative efficiency of commercial banks in the Republic of North Macedonia: DEA window analysis. *Croatian Operational Research Review* 217 CRORR 11, 217-227.
10. Cvetkoska, V., Fotova Ciković, K., & Tasheva, M. (2021). Efficiency of Commercial Banking in Developing Countries. *Mathematic*, 9, 1597. <https://doi.org/10.3390/math9141597>

11. Demir, G. (2022). Analysis of the financial performance of the deposit banking sector in the Covid-19 period with LMAW-DNMA methods. *International Journal of Insurance and Finance*, 2(2), 17-36. <https://doi.org/10.52898/ijif.2022.7>
12. Ecer, F. (2020). Multi-criteria Decision-making comprehensive approach from past to present. Seçkin Publications.
13. Ecer, F., & Pamucar, P. (2022). A novel LOPCOWyDOBI multi-criteria sustainability performance assessment methodology: An application in developing country banking sector. *Omega*, 112, 102690. <https://doi.org/10.1016/j.omega.2022.102690>.
14. Fenyves, V., & Tarnóczy, T. (2020). Data envelopment analysis for measuring performance in a competitive market. *Problems and Perspectives in Management*, 18(1), 315-325. doi:10.21511/ppm.18(1).2020.27
15. Guo, D., & Cai, Z.Q. (2020). Super-Efficiency Infeasibility in the Presence of Nonradial Measurement. *Mathematical Problems in Engineering*, 2020, Article ID 6264852, 7 pages. <https://doi.org/10.1155/2020/6264852>
16. Hwang C.L., & Yoon K.S. (1981). Multiple attribute decision making: methods and applications. Berlin: Springer.
17. Hwang, C. L., & Yoon, K.P. (1995). Multiple Attribute Decision Making: An Introduction. Paperback / Sage Publications.
18. Lee, H.S., Chu, C.W. & J. Zhu, J. (2011). Super-efficiency DEA in the presence of infeasibility. *European Journal of Operational Research*, 212(1), 141-147.
19. Liao, H., & Wu, X. (2020). DNMA: A double normalization-based multiple aggregation methods for multi-expert multi-criteria decision making. *Omega*, 94, 102058. <https://doi.org/10.1016/j.omega.2019.04.001>
20. Lin, R. (2020). Cross-efficiency evaluation capable of dealing with negative data: A directional distance function based approach. *Journal of the Operational Research Society*, 71(3), 505-516.
21. Lukic, R., Sokic, M. & Vojteski Kljenak, D. (2017). Efficiency Analysis Of Banking Sector In Republic Of Serbia. *Business Excellence and Management*, 7(4), 5-17.
22. Lukić, R. (2018a). Bankarsko računovodstvo. Beograd: Ekonomski fakultet.
23. Lukic, R. (2018d). Analysis of the efficiency of insurance companies. In: Insurance in the post-crisis era, Belgrade: Faculty of Economics, University of Belgrade. ISBN: 978-86-403-1548-7.
24. Lukic, R., & Hadrovic Zekic, B. (2019). Evaluation of efficiency of trade companies in Serbia using the DEA approach. *Proceedings of the 19 th International Scientific Conference Business logistics in modern management* October 10-11, Osijek, Croatia, Josip Juraj Strossmayer, 145-162.
25. Lukic, R. (2021). Application of the EDAS method in the evaluation of bank efficiency in Serbia. *Bankarstvo - Banking*, 50(2), 13-24. doi: 10.5937/bankarstvo2102064L
26. Lukić, R. (2022a). Evaluation of the efficiency of banks in Serbia using the MABAC method. *Bankarstvo - Banking*, 2, 35-60. DOI: 10.5937/bankarstvo2202010L
27. Lukić, R. (2022b). Analysis of financial performance and efficiency of banks in Serbia using fuzzy LMAW and MARCOS methods. *Bankarstvo - Banking*, 4, 130-169.
28. Lukic, R. (2023a). Merenje i analiza dinamike profitabilnosti bankarskog sektora u Srbiji na bazi FLMAW-MARCOS metoda. *Measurement and Analysis of Profitability Dynamics of the Banking Sector in Serbia Based on the FLMAW-MARCOS Method. Banking - Bankarstvo*, 8-47. DOI: 10.5937/bankarstvo2301028L

29. Lukić, R. (2023b). Analysis of the performance of companies in Serbia listed on the Belgrade stock exchange. *Zbornik radova/Conference Proceedings, Računovodstvo i revizija u teoriji i praksi / Accounting and audit in theory and practice, Banja Luka College / Besjeda Banja Luka*, 5(5), 69-80. DOI 10.7251/ZRRRTP2301069L
30. Lukić, R. (2023c). Application of PROMETHEE Method in Evaluation of Insurance Efficiency in Serbia. *Revija za ekonomske in poslovne vede, Journal of Economic and Business Sciences*, 10(1), 3-19. DOI: <https://doi.org/10.55707/eb.v10i1.121>
31. Lukic, R. (2023d). Application of the LMAW-DNMA method in the evaluation of the environmental problem in the agriculture of selected European Union countries. *Acta Agriculturae Serbica*, 28 (55), 49-61. doi: 10.5937/AASer2355049L
32. Lukić, R. (2023e). Analysis of the liquidity dynamics of the banking sector in Serbia based on the TOPSIS method. *Bankarstvo-Banking*, 2-3, 28-35. DOI: 10.5937/bankarstvo2302008L
33. Lukić, B. (2023f). Analysis of the dynamics of the capital adequacy of the bank sector in Serbia based on the LMAW-DNMA method. *Bankarstvo*, Vol. 52, Issue 4, 35-69. DOI: 10.5937/bankarstvo2304035L
34. Lukić, R. (2023g). Analysis of the performance of insurance companies in Serbia based on the AHP-TOPSIS method. *Marsonia: časopis za društvena i humanistička istraživanja • God. 2, br. 2, 2023.*, pp. 21-35.
35. Lukić, R. (2023h). Analysis Of The Efficiency Of Insurance Companies In Serbia. *Revija za ekonomske in poslovne vede*, 10 (2), 47-64. DOI: <https://doi.org/10.55707/eb.v10i2.128>
36. Maletić, R., Kreća, M., & Maletić, P. (2013). Application of DEA methodology in measuring efficiency in the banking sector. *Economics of Agriculture*, 60(4), 843–855. <https://www.ea.bg.ac.rs/index.php/EA/article/view/423>
37. Milenkovic, N., Radovanov, B., Kalaš, B., & Horvat, A.M. (2022). External Two Stage DEA Analysis of Bank Efficiency in West Balkan Countries. *Sustainability*, 14, 978. <https://doi.org/10.3390/su14020978>
38. Pamučar, D., Žižović, M., Biswas, S., & Božanić, D. (2021). A new logarithm methodology of additive weights (LMAW) for multi-criteria decision-making: Application in logistics. *Facta Univ. Ser. Mech. Eng.*, 2021, 19, 361–380. <https://doi.org/10.22190/FUME210214031P>
39. Puška, A., Božanić, D., Nedeljković, M., & Janošević, M. (2022). Green Supplier Selection in an Uncertain Environment in Agriculture Using a Hybrid MCDM Model: Z-Numbers–Fuzzy LMAW–Fuzzy CRADIS Model. *Axioms*, 11, 427. <https://doi.org/10.3390/axioms1109042>
40. Pendharkar, P.C. (2021). Hybrid radial basis function DEA and its applications to regression, segmentation and cluster analysis problems. *Machine Learning with Applications*, 6, 100092. <https://doi.org/10.1016/j.mlwa.2021.100092>.
41. Peykani, P., Seyed Esmaeili, F.S., Mirmozaffari, M., Jabbarzadeh, A., & Khamechian, M. (2022). Input/Output Variables Selection in Data Envelopment Analysis: A Shannon Entropy Approach. *Mach. Learn. Knowl. Extr.*, 4, 688–699. <https://doi.org/10.3390/make4030032>
42. Peykani, P., Gheidar-Kheljani, J., Farzipoor Saen, R., & Mohammadi, E. (2022a). Generalized Robust Window Data Envelopment Analysis Approach for Dynamic Performance Measurement under Uncertain Panel Data. *Operational Research*, 1-36. <https://doi.org/10.1007/s12351-022-00729-7>.
43. Podinovski, V.V., & Bouzdine-Chameeva, T. (2021). Optimal solutions of multiplier DEA models. *J Prod Anal*, 56, 45–68. <https://doi.org/10.1007/s11123-021-00610-3>

44. Radojicic, M., Savic, G., & Jeremic, V. (2018). Measuring the efficiency of banks: the bootstrapped I-distance GAR DEA approach. *Technological and Economic Development of Economy*, 24(4), 1581-1605. <https://doi.org/10.3846/tede.2018.3699>
45. Rose, P (1996). *Comercial Bank Management*. Chicago: IRWIN.
46. Rostamzadeh, R., Akbarian, O., Banaitis, A., & Soltani, Z. (2021). Application of DEA in benchmarking: a systematic literature review from 2003–2020. *Technological and Economic Development of Economy*, 27(1), 175-222. <https://doi.org/10.3846/tede.2021.13406>
47. Savić, G., Radosavljević, M., & Ilievski, D. (2012). DEA Window analysis approach for measuring the efficiency of Serbian banks. *Management - časopis za teoriju i praksu menadžmenta*, 17(65), 5-14.
48. Saaty, T. L. (2008). Decision Making With The Analytic Hierarchy Process. *Int J Serv Sci*, 1(1), 83-98. <https://doi.org/10.1504/IJSSCI.2008.017590>
49. Stević, Ž., Pamučar, D., Puška, A., & Chatterjee, P. (2020). Sustainable supplier selection in healthcare industries using a new MCDM method: Measurement of alternatives and ranking according to COMpromise solution (MARCOS). *Computers & Industrial Engineering*, 140, 106231. <https://doi.org/10.1016/j.cie.2019.106231>.
50. Stević, Ž., & Brković, N. A. (2020). Novel Integrated FUCOM-MARCOS Model for Evaluation of Human Resources in a Transport Company. *Logistics*, 4, 4. <https://doi.org/10.3390/logistics4010004>
51. Tone, K. (2002). A slacks-based measure of super-efficiency in data envelopment analysis. *European Journal of Operational Research*, 143, 32-41.
52. Tsai, Chi-Mao; Lee, Hsuan-Shih; & Gan, Guo-Ya (2021). A New Fuzzy DEA Model for Solving the MCDM Problems in Supplier Selection. *Journal of Marine Science and Technology*: 29(1), Article 7. DOI: 10.51400/2709-6998.1006
53. Üçüncü, T., Akyüz, K. C., Akyüz, İ., Bayram, B. Ç., & Ve Ersen, N. (2018). Evaluation Of Financial Performance Of Paper Companies Traded At BIST With TOPSIS Method. *Kastamonu University Journal Of ForestryFaculty*, 18(1), 92-98.
54. Ünlü, U., Yalçın, N., & Avşarlıgil, N. (2022). Analysis of Efficiency and Productivity of Commercial Banks in Turkey Pre- and during COVID-19 with an Integrated MCDM Approach. *Mathematics*, 10(13), 2300. <https://doi.org/10.3390/math10132300>

Aneks

Tabela 4 - Inicijalna matrica

Inicijalna matrica	Kind	1	1	1	1	1	1	1	1	1	1	1	1
	Weight	0,0885	0,0818	0,0797	0,0831	0,0857	0,0772	0,0842	0,0832	0,0727	0,0851	0,0895	0,0885
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
	A1	11,3	1,1	6,6	0,9	0,7	52,4	35,3	13,9	2,8	56,9	73,2	8,2
	A2	15,7	0,6	10,9	1,7	0,5	53,3	32,2	13,7	0,8	50,9	61,4	9,6
	A3	16,9	0,1	2,8	3,5	1,2	57	33,3	15,4	2	47,2	53,9	9,1
	A4	19	0,1	6,5	3,4	1,6	54,9	31,9	15	1,6	51	57	10,8
	A5	18,6	0,3	2,1	3	1,6	58,2	33	16,1	1,9	50	54,9	10,2
	A6	21,4	0,3	5,8	2,3	1,6	54,1	34,8	16,8	1,1	50,9	55,8	11,9
	A7	21,5	0,8	0,4	2,3	0,5	56,3	38,3	18	1,4	54,9	59	12,7
	A8	21,6	0,1	1,6	1,7	0,7	55,9	39,1	18,1	0,9	62,3	66,8	14,4
	A9	17	0,5	1,7	1,5	0,9	52,6	41,5	17,9	1,4	67,8	72,9	12,4
	A10	9,8	0,3	2,1	1,3	0,9	50,5	42,9	16,9	2	58,1	66,8	6,6
	A11	5,7	0,4	0,7	1,1	0,8	50	44,3	16,8	2,6	60,2	78,7	4,5
	A12	4,1	0,4	2,8	1,5	0,8	49,2	43,8	15,8	1,5	61,5	84,2	3,4
	A13	3,7	0,3	1,1	1,6	0,8	49,6	45	16,4	1,6	59	93,4	3,5
	A14	3,6	0	1,5	1,7	0,6	49,3	45	17,4	1,9	56,3	88,5	3,2
	A15	3	0,7	3,3	2,2	1,1	47,6	43,2	17,4	2	58,1	102,5	3,1
	A16	3,2	0,2	11	2,7	1	43,4	39,4	15,5	2,3	60,5	101	3,2
	MAX	21,6000	1,1000	11,0000	3,5000	1,6000	58,2000	45,0000	18,1000	2,8000	67,8000	102,5000	14,4000
	MIN	3,0000	0,0000	0,4000	0,9000	0,5000	43,4000	31,9000	13,7000	0,8000	47,2000	53,9000	3,1000

Tabela 5 - Linearna normalizovana matrica

Linearna normalizovana matrica		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0,4462	1,0000	0,5849	0,0000	0,1818	0,6081	0,2595	0,0455	1,0000	0,4709	0,3971	0,4513	1,0000
	A2	0,6828	0,5455	0,9906	0,3077	0,0000	0,6689	0,0229	0,0000	0,0000	0,1796	0,1543	0,5752	0,9906
	A3	0,7473	0,0909	0,2264	1,0000	0,6364	0,9189	0,1069	0,3864	0,6000	0,0000	0,0000	0,5310	1,0000
	A4	0,8602	0,0909	0,5755	0,9615	1,0000	0,7770	0,0000	0,2955	0,4000	0,1845	0,0638	0,6814	1,0000
	A5	0,8387	0,2727	0,1604	0,8077	1,0000	1,0000	0,0840	0,5455	0,5500	0,1359	0,0206	0,6283	1,0000
	A6	0,9892	0,2727	0,5094	0,5385	1,0000	0,7230	0,2214	0,7045	0,1500	0,1796	0,0391	0,7788	1,0000
	A7	0,9946	0,7273	0,0000	0,5385	0,0000	0,8716	0,4885	0,9773	0,3000	0,3738	0,1049	0,8496	0,9946
	A8	1,0000	0,0909	0,1132	0,3077	0,1818	0,8446	0,5496	1,0000	0,0500	0,7330	0,2654	1,0000	1,0000
	A9	0,7527	0,4545	0,1226	0,2308	0,3636	0,6216	0,7328	0,9545	0,3000	1,0000	0,3909	0,8230	1,0000
	A10	0,3656	0,2727	0,1604	0,1538	0,3636	0,4797	0,8397	0,7273	0,6000	0,5291	0,2654	0,3097	0,8397
	A11	0,1452	0,3636	0,0283	0,0769	0,2727	0,4459	0,9466	0,7045	0,9000	0,6311	0,5103	0,1239	0,9466
	A12	0,0591	0,3636	0,2264	0,2308	0,2727	0,3919	0,9084	0,4773	0,3500	0,6942	0,6235	0,0265	0,9084
	A13	0,0376	0,2727	0,0660	0,2692	0,2727	0,4189	1,0000	0,6136	0,4000	0,5728	0,8128	0,0354	1,0000
	A14	0,0323	0,0000	0,1038	0,3077	0,0909	0,3986	1,0000	0,8409	0,5500	0,4417	0,7119	0,0088	1,0000
	A15	0,0000	0,6364	0,2736	0,5000	0,5455	0,2838	0,8626	0,8409	0,6000	0,5291	1,0000	0,0000	1,0000
	A16	0,0108	0,1818	1,0000	0,6923	0,4545	0,0000	0,5725	0,4091	0,7500	0,6456	0,9691	0,0088	1,0000

Tabela 6 - Vektor normalizovane matrice

Vektor normalizovane matrice		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0,8307	1,0000	0,8080	0,7216	0,7950	0,9733	0,9406	0,9382	1,0000	0,9541	0,9074	0,8373	1,0000
	A2	0,9030	0,7744	0,9956	0,8073	0,7494	0,9774	0,9216	0,9352	0,7437	0,9288	0,8701	0,8740	0,9956
	A3	0,9227	0,5487	0,6422	1,0000	0,9089	0,9945	0,9283	0,9603	0,8975	0,9132	0,8465	0,8609	1,0000
	A4	0,9573	0,5487	0,8036	0,9893	1,0000	0,9848	0,9197	0,9544	0,8462	0,9292	0,8562	0,9055	1,0000
	A5	0,9507	0,6390	0,6116	0,9465	1,0000	1,0000	0,9265	0,9706	0,8847	0,9250	0,8496	0,8898	1,0000
	A6	0,9967	0,6390	0,7731	0,8715	1,0000	0,9811	0,9375	0,9809	0,7822	0,9288	0,8525	0,9344	1,0000
	A7	0,9984	0,8646	0,5375	0,8715	0,7494	0,9912	0,9590	0,9985	0,8206	0,9456	0,8626	0,9554	0,9985
	A8	1,0000	0,5487	0,5898	0,8073	0,7950	0,9894	0,9639	1,0000	0,7565	0,9768	0,8872	1,0000	1,0000
	A9	0,9244	0,7292	0,5942	0,7858	0,8405	0,9742	0,9786	0,9971	0,8206	1,0000	0,9065	0,9475	1,0000
	A10	0,8060	0,6390	0,6116	0,7644	0,8405	0,9645	0,9871	0,9823	0,8975	0,9591	0,8872	0,7953	0,9871
	A11	0,7386	0,6841	0,5506	0,7430	0,8178	0,9622	0,9957	0,9809	0,9744	0,9680	0,9248	0,7402	0,9957
	A12	0,7123	0,6841	0,6422	0,7858	0,8178	0,9585	0,9926	0,9661	0,8334	0,9734	0,9422	0,7113	0,9926
	A13	0,7057	0,6390	0,5680	0,7965	0,8178	0,9604	1,0000	0,9750	0,8462	0,9629	0,9712	0,7139	1,0000
	A14	0,7041	0,0000	0,5855	0,8073	0,7722	0,9590	1,0000	0,9897	0,8847	0,9515	0,9558	0,7061	1,0000
	A15	0,6942	0,8195	0,6640	0,8608	0,8861	0,9512	0,9890	0,9897	0,8975	0,9591	1,0000	0,7034	1,0000
	A16	0,6975	0,5938	1,0000	0,9143	0,8633	0,9318	0,9657	0,9617	0,9359	0,9692	0,9953	0,7061	1,0000
	Adj Wj	0,1179	0,0968	0,1058	0,0924	0,0954	0,0488	0,0646	0,0535	0,0817	0,0560	0,0812	0,1058	

Tabela 7 - CCM (Kompletan Kompenzacioni Model)

Vektor normalizovane matrice	u1(ai)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	SUM
	A1	0,0526	0,0968	0,0619	0,0000	0,0173	0,0297	0,0168	0,0024	0,0817	0,0264	0,0323	0,0478	0,4656
	A2	0,0813	0,0533	0,1058	0,0287	0,0000	0,0329	0,0015	0,0000	0,0000	0,0102	0,0127	0,0615	0,3878
	A3	0,0881	0,0088	0,0240	0,0924	0,0607	0,0448	0,0069	0,0207	0,0490	0,0000	0,0000	0,0562	0,4516
	A4	0,1014	0,0088	0,0609	0,0889	0,0954	0,0379	0,0000	0,0158	0,0327	0,0103	0,0052	0,0721	0,5294
	A5	0,0989	0,0264	0,0170	0,0747	0,0954	0,0488	0,0054	0,0292	0,0449	0,0076	0,0017	0,0665	0,5164
	A6	0,1166	0,0264	0,0539	0,0498	0,0954	0,0353	0,0143	0,0377	0,0122	0,0101	0,0032	0,0824	0,5372
	A7	0,1179	0,0708	0,0000	0,0500	0,0000	0,0428	0,0317	0,0525	0,0246	0,0211	0,0086	0,0904	0,5104
	A8	0,1179	0,0088	0,0120	0,0284	0,0173	0,0412	0,0355	0,0535	0,0041	0,0411	0,0216	0,1058	0,4872
	A9	0,0887	0,0440	0,0130	0,0213	0,0347	0,0303	0,0474	0,0510	0,0245	0,0560	0,0318	0,0871	0,5299
	A10	0,0513	0,0315	0,0202	0,0169	0,0413	0,0279	0,0646	0,0463	0,0583	0,0353	0,0257	0,0390	0,4584
	A11	0,0181	0,0372	0,0032	0,0075	0,0275	0,0230	0,0646	0,0398	0,0776	0,0374	0,0438	0,0139	0,3935
	A12	0,0077	0,0388	0,0264	0,0235	0,0286	0,0210	0,0646	0,0281	0,0315	0,0428	0,0557	0,0031	0,3718
	A13	0,0044	0,0264	0,0070	0,0249	0,0260	0,0204	0,0646	0,0328	0,0327	0,0321	0,0660	0,0037	0,3411
	A14	0,0038	0,0000	0,0110	0,0284	0,0087	0,0194	0,0646	0,0450	0,0449	0,0248	0,0578	0,0009	0,3094
	A15	0,0000	0,0616	0,0290	0,0462	0,0520	0,0138	0,0557	0,0450	0,0490	0,0297	0,0812	0,0000	0,4632
	A16	0,0013	0,0176	0,1058	0,0640	0,0433	0,0000	0,0370	0,0219	0,0612	0,0362	0,0787	0,0009	0,4680

Tabela 8 - UCM (Nekompenzacioni model)

UCM (Nekompe- zacioni model)	u2(ai)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0,0653	0,0000	0,0439	0,0924	0,0780	0,0191	0,0478	0,0510	0,0000	0,0297	0,0490	0,0581	0,0924
	A2	0,0366	0,0435	0,0000	0,0637	0,0954	0,0158	0,0631	0,0535	0,0817	0,0459	0,0686	0,0444	0,0954
	A3	0,0298	0,0880	0,0819	0,0000	0,0347	0,0040	0,0577	0,0328	0,0327	0,0560	0,0812	0,0496	0,0880
	A4	0,0165	0,0880	0,0449	0,0036	0,0000	0,0109	0,0646	0,0377	0,0490	0,0457	0,0760	0,0337	0,0880
	A5	0,0190	0,0704	0,0889	0,0178	0,0000	0,0000	0,0592	0,0243	0,0367	0,0484	0,0796	0,0393	0,0889
	A6	0,0013	0,0704	0,0519	0,0427	0,0000	0,0135	0,0503	0,0158	0,0694	0,0460	0,0781	0,0234	0,0781
	A7	0,0000	0,0260	0,1058	0,0424	0,0954	0,0060	0,0329	0,0009	0,0570	0,0350	0,0727	0,0154	0,1058
	A8	0,0000	0,0880	0,0938	0,0640	0,0780	0,0076	0,0291	0,0000	0,0776	0,0150	0,0597	0,0000	0,0938
	A9	0,0292	0,0528	0,0929	0,0711	0,0607	0,0185	0,0173	0,0024	0,0572	0,0000	0,0495	0,0187	0,0929
	A10	0,0666	0,0654	0,0856	0,0755	0,0541	0,0209	0,0000	0,0072	0,0233	0,0207	0,0556	0,0668	0,0856
	A11	0,0998	0,0596	0,1027	0,0849	0,0679	0,0258	0,0000	0,0137	0,0040	0,0187	0,0374	0,0920	0,1027
	A12	0,1102	0,0581	0,0795	0,0690	0,0667	0,0277	0,0000	0,0254	0,0502	0,0132	0,0255	0,1027	0,1102
	A13	0,1135	0,0704	0,0988	0,0676	0,0693	0,0283	0,0000	0,0207	0,0490	0,0239	0,0152	0,1021	0,1135
	A14	0,1141	0,0000	0,0948	0,0640	0,0867	0,0293	0,0000	0,0085	0,0367	0,0313	0,0234	0,1049	0,1141
	A15	0,1179	0,0352	0,0769	0,0462	0,0433	0,0349	0,0089	0,0085	0,0327	0,0264	0,0000	0,1058	0,1179
	A16	0,1166	0,0792	0,0000	0,0284	0,0520	0,0488	0,0276	0,0316	0,0204	0,0199	0,0025	0,1049	0,1166

Tabela 9 - ICM (Nekompletan kompenzacioni model)

	u3(ai)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0,9784	1,0000	0,9777	0,9703	0,9784	0,9987	0,9960	0,9966	1,0000	0,9974	0,9921	0,9814	0,8742
	A2	0,9886	0,9760	1,0000	0,9808	0,9733	0,9991	0,9950	0,9967	0,9765	0,9961	0,9891	0,9863	0,8659
	A3	0,9906	0,9435	0,9542	1,0000	0,9909	0,9997	0,9952	0,9978	0,9912	0,9949	0,9866	0,9843	0,8402
	A4	0,9949	0,9435	0,9771	0,9990	1,0000	0,9993	0,9946	0,9975	0,9865	0,9959	0,9875	0,9896	0,8721
	A5	0,9941	0,9576	0,9493	0,9949	1,0000	1,0000	0,9951	0,9984	0,9900	0,9956	0,9868	0,9877	0,8582
	A6	0,9996	0,9576	0,9731	0,9874	1,0000	0,9991	0,9958	0,9990	0,9801	0,9959	0,9871	0,9928	0,8744
	A7	1,0000	0,9862	0,9366	0,9875	0,9730	0,9996	0,9974	1,0000	0,9841	0,9970	0,9882	0,9953	0,8538
	A8	1,0000	0,9435	0,9457	0,9804	0,9784	0,9995	0,9976	1,0000	0,9775	0,9987	0,9903	1,0000	0,8250
	A9	0,9908	0,9699	0,9464	0,9780	0,9836	0,9987	0,9986	0,9998	0,9840	1,0000	0,9921	0,9943	0,8467
	A10	0,9764	0,9588	0,9506	0,9766	0,9848	0,9989	1,0000	0,9997	0,9923	0,9984	0,9914	0,9774	0,8204
	A11	0,9654	0,9643	0,9392	0,9733	0,9814	0,9983	1,0000	0,9992	0,9982	0,9984	0,9940	0,9691	0,7999
	A12	0,9616	0,9646	0,9550	0,9786	0,9817	0,9983	1,0000	0,9986	0,9858	0,9989	0,9958	0,9653	0,8030
	A13	0,9597	0,9576	0,9419	0,9792	0,9810	0,9980	1,0000	0,9986	0,9865	0,9979	0,9976	0,9650	0,7853
	A14	0,9595	0,0000	0,9449	0,9804	0,9757	0,9980	1,0000	0,9994	0,9900	0,9972	0,9963	0,9638	0,0000
	A15	0,9579	0,9809	0,9576	0,9862	0,9885	0,9976	0,9993	0,9994	0,9912	0,9977	1,0000	0,9635	0,8327
	A16	0,9584	0,9508	1,0000	0,9918	0,9861	0,9966	0,9977	0,9979	0,9946	0,9983	0,9996	0,9638	0,8459

Tabela 10 - Rezultati LMAW-DNMA metoda

											w1	w2	w3	
											0,6	0,1	0,3	
		CCM		φ		UCM	φ		ICM	φ	Utility Values			Rank Order
		u1(ai)	Rank	0.5	u2(ai)	Rank	0.5	u3(ai)	Rank	0.5				
2008	A1	0,4656	8	0,7306	0,0924	6	0,6146	0,8742	2	0,9691	0,7905	0,7905		6
2009	A2	0,3878	13	0,5402	0,0954	9	0,6966	0,8659	4	0,9057	0,6655	0,6655		12
2010	A3	0,4516	11	0,6508	0,0880	4	0,5568	0,8402	9	0,7659	0,6759	0,6759		10
2011	A4	0,5294	3	0,9318	0,0880	4	0,5568	0,8721	3	0,9381	0,8962	0,8962		2
2012	A5	0,5164	4	0,8899	0,0889	5	0,5769	0,8582	5	0,8734	0,8537	0,8537		4
2013	A6	0,5372	1	1,0000	0,0781	1	0,4702	0,8744	1	1,0000	0,9470	0,9470		1
2014	A7	0,5104	5	0,8559	0,1058	11	0,7995	0,8538	6	0,8444	0,8468	0,8468		5
2015	A8	0,4872	6	0,8047	0,0938	8	0,6647	0,8250	11	0,7179	0,7647	0,7647		8
2016	A9	0,5299	2	0,9622	0,0929	7	0,6371	0,8467	7	0,8149	0,8855	0,8855		3
2017	A10	0,4584	10	0,6780	0,0856	2	0,5211	0,8204	12	0,6993	0,6687	0,6687		11
2018	A11	0,3935	12	0,5630	0,1027	10	0,7580	0,7999	14	0,6603	0,6117	0,6117		13
2019	A12	0,3718	14	0,5070	0,1102	12	0,8475	0,8030	13	0,6730	0,5909	0,5909		14
2020	A13	0,3411	15	0,4576	0,1135	13	0,8906	0,7853	15	0,6412	0,5560	0,5560		15
2021	A14	0,3094	16	0,4096	0,1141	14	0,9225	0,0000	16	0,0442	0,3513	0,3513		16
2022	A15	0,4632	9	0,7048	0,1179	16	1,0000	0,8327	10	0,7410	0,7452	0,7452		9
2023	A16	0,4680	7	0,7581	0,1166	15	0,9637	0,8459	8	0,7913	0,7886	0,7886		7
	MAX	0,5372			0,1179				0,8744					

Received: 10.04.2024.
Accepted: 22.05.2024.

DOI: 10.5937/bankarstvo2403018L

ANALYSIS OF THE ASSETS QUALITY OF THE BANKING SECTOR IN SERBIA

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Summary: Investigating the quality of banking sector assets is very challenging, continuously adapting, complex, and significant. The quality of assets significantly affects the overall performance of the banking sector. Hence, it is necessary to manage the asset quality of the banking sector as effectively as possible. Bearing that in mind, this paper analyzes the dynamics of asset quality in the banking sector in Serbia based on the LMAW-DNMA method. According to the results of the LMAW-DNMA method, the best asset quality of the banking sector in Serbia was achieved in 2013 and then in 2011, 2016, 2012, and 2014. The unfavorable quality of the assets of the banking sector in Serbia in the period 2019-2021 was affected by the COVID-19 pandemic by causing a decline in economic and thus credit activities, and to a large extent prolonging the repayment of credit obligations. In 2022 and 2023, a slight improvement in the quality of banking sector assets in Serbia was recorded. Therefore, it is necessary, among other things, to manage credit risks as efficiently as possible and, consequently, to carry out an adequate distribution of available loans to the economy, sectors, and the population to achieve the target quality of assets of the banking sector in Serbia.

Keywords: problem loans, distribution of available credit, banking sector, Serbia

JEL classification: D40, G21

Introduction

The issue of analyzing the quality of assets in the banking sector is very important, continuously adapting, complex, and challenging. For the reason that the quality of assets significantly affects the performance of the banking sector. Adequate asset quality management can significantly influence the achievement of the target performance of the banking sector. Based on the above, this paper investigates the dynamics of asset quality in the banking sector in Serbia based on the LMAW-DNMA method. This manifests the subject and goal of this work.

The literature devoted to the development and importance of the application of the DEA (Data Envelopment Analysis) model in the analysis of the efficiency of various entities is very rich (Hwang & Yoon, 1981, 1995; Andersen & Petersen, 1993; Banker et al., 1984; Chen et al., 2021; Chang & Wang, 2020; Guo & Cai, 2020; Lee et al., 2011; Lin, 2020; Pendharkar, 2021; Tone, 2002; Podinovski Podinovski & Bouzdine-Chameeva, 2021; Bouzdine-Chameeva et al., 2021; Rostamzadeh et al., 2021; Fenyves & Tarnóczy, 2020; Tsai et al., 2021; Stević & Brković, 2020; Stević et al., 2020; Saaty, 2008; Peykani et al., 2022a,b). DEA models are very successfully applied in the analysis of the efficiency of financial institutions (banks, insurance companies and others) (Savic et al., 2012; Maletić et al., 2013; Radojicic et al., 2018; Cvetkoska & Savic, 2017; Cvetkoska & Cikovic, 2020; Cvetkovska et al., 2021; Lukic et al., 2017; Lukic & Hadrovic Zekic, 2019; Lukić, 2018a,b, 2021, 2022a,b,2023a,b,c,d,e; Milenković et al., 2022). When analyzing financial performance (liquidity, solvency and profitability) and efficiency of banks, various methods of multi-criteria decision making (MCDM - Multi-Criteria Decision Making), including the LMAW-DNMA method (Ünlü et al., 2022) are often applied, integrally or individually (Ali et al., 2022, Lukic, 2022a,b; 2023f,g,h; Demir, 2022; Ecer & Pamucar, 2022), since the methods of multi-criteria decision-making to obtain the most realistic assessment simultaneously integrate several indicators (criteria) of the performance of the banking sector. All relevant literature in this paper is used as a theoretical-methodological and empirical basis for the analysis of the dynamics of the asset quality of the banking sector in Serbia using the LMAW-DNMA method.

The main research hypothesis in this paper is based on the fact that the quality of assets is a significant determinant of the performance of the banking sector (in the specific case of Serbia). To achieve the target performance of the banking sector, it is necessary to manage the quality of assets, i.e. credit risk, as efficiently as possible.

In the methodological sense of the word, the application of LMAW-DNMA methods plays a significant role in this. The analysis, with the aim of a more realistic evaluation, simultaneously includes several indicators (criteria) of the quality of banking sector assets, which is not the case with ratio analysis.

Empirical data needed for the research of the asset quality of the banking sector in Serbia were collected from the National Bank of Serbia. They are "produced" by the relevant international standards (International Financial Reporting Standards, Basel Standards). This makes it possible to compare the quality of banking sector assets in Serbia with other comparable countries without any restrictions if similar research is carried out. However, as far as we know, there are no similar studies in the literature for other countries, and due to their importance, it is recommended that they be carried out.

1. Methodology

In further presentations of the issues treated in this paper, we will briefly refer to the characteristics of the LMAW and DNMA methods. (This text is entirely identical to the text in the paper "Analysis of the Dynamics of the Capital Adequacy of the Bank sector in Serbia based on the LMAW-DNMA Method" published in Bankarstvo Journal, 2023, vol. 52, no. 4, authored by Prof. Radojko Lukić, PhD, because the same methodology is used research only applied to the case of asset quality analysis of the banking sector in Serbia.)

LMAW method

The LMAW (Logarithm Methodology of Additive Weights) method is the latest method used to calculate criteria weights and rank alternatives (Liao, & Wu, 2020; Demir, 2022). It takes place through the following steps: m alternatives $A = \{A_1, A_2, \dots, A_m\}$ are evaluated in comparison with n criteria $C = \{C_1, C_2, \dots, C_n\}$ with the participation of k experts $E = \{E_1, E_2, \dots, E_k\}$ and according to a pre-defined linguistic scale (Pamućar et al, 2021).

Step 1: Determination of weight coefficients of criteria

Experts $E = \{E_1, E_2, \dots, E_k\}$ set priorities with criteria $C = \{C_1, C_2, \dots, C_n\}$ in relation to previously defined values of the linguistic scale. At the same time, they assign a higher value to the criterion of greater importance and a lower value to the criterion of less importance on the linguistic scale. By the way, the priority vector is also obtained. The label γ_{cn}^e represents the value of the linguistic scale that the expert e ($1 \leq e \leq k$) assigns to the criterion C_t ($1 \leq t \leq n$).

Step 1.1: Defining the absolute anti-ideal point γ_{AIP}

The absolute ideal point should be less than the smallest value in the priority vector. It is calculated according to the equation:

$$\gamma_{AIP} = \frac{\gamma_{min}^e}{S}$$

where is γ_{min}^e the minimum value of the priority vector and S should be greater than the base logarithmic function. In the case of using the function $\ln$, the value of S can be chosen as 3.

Step 1.2: Determining the relationship between the priority vector and the absolute anti-ideal point

The relationship between the priority vector and the absolute anti-ideal point is calculated using the following equation:

$$n_{cn}^e = \frac{\gamma_{cn}^e}{\gamma_{AIP}} \quad (1)$$

So the relational vector is $R^e = (n_{c1}^e, n_{c2}^e, \dots, n_{cn}^e)$ obtained. Where n_{cn}^e represents the value of the relation vector derived from the previous equation, and R^e represents the relational vector ($1 \leq e \leq k$).

Step 1.3: Determination of the vector of weight coefficients

The vector of weight coefficients $w = (w_1, w_2, \dots, w_n)^T$ is calculated by the expert $e(1 \leq e \leq k)$ using the following equation:

$$w_j^e = \frac{\log_A(n_{cn}^e)}{\log_A(\prod_{j=1}^n n_{cn}^e)}, A > 1 \quad (2)$$

where w_j^e it represents the weighting coefficients obtained according to expert evaluations e^{th} and the elements n_{cn}^e of the realization vector R . The obtained values for the weighting coefficients must meet the condition that $\sum_{j=1}^n w_j^e = 1$.

By applying the Bonferroni aggregator shown in the following equation, the aggregated vector of weight coefficients is determined $w = (w_1, w_2, \dots, w_n)^T$:

$$W_j = \left(\frac{1}{k(k-1)} \cdot \sum_{x=1}^k (w_j^{(x)})^p \cdot \sum_{\substack{y=1 \\ y \neq x}}^k (w_{ij}^{(y)})^q \right)^{\frac{1}{p+q}} \quad (3)$$

The values of p and q are stabilization parameters and $p, q \geq 0$. The resulting weight coefficients should fulfill the condition that $\sum_{j=1}^n w_j = 1$.

DNMA method

DNMA (Double Normalization-based Multiple Aggregation) method is a newer method for showing alternatives (Demir, 2022). Two different normalized (linear and vector) techniques are used, as well as three different coupling functions (Complete Compensation Model - CCM, Uncompensatory Model - UCM, and Incomplete Compensation Model - ICM). The steps for applying this method are as follows (Liao & Wu, 2020; Ecer, 2020):

Step 1: Normalized decision matrix

The elements of the decision matrix are normalized with linear ($\hat{x}_{ij}^{1N}$) normalization using the following equation:

$$\hat{x}_{ij}^{1N} = 1 - \frac{|x^{ij} - r_j|}{\max\{\max_i x^{ij}, r_j\} - \min\{\min_i x^{ij}, r_j\}} \quad (4)$$

The vector ($\hat{x}_{ij}^{2N}$) is normalized using the following equation:

$$\hat{x}_{ij}^{2N} = 1 - \frac{|x^{ij} - r_j|}{\sqrt{\sum_{i=1}^m (x^{ij})^2 + (r_j)^2}} \quad (5)$$

The value r_j the target value for c_j the criterion and is considered $\max_i x^{ij}$ for both utility and $\min_i x^{ij}$ cost criteria.

Step 2: Determining the weight of the criteria

This step consists of three phases:

Step 2.1: In this phase, the standard deviation $(\sigma_j)_j$ for the criterion C_j determined with the following equation where m is the number of alternatives:

$$\sigma_j = \sqrt{\frac{\sum_{i=1}^m \left(\frac{x^{ij}}{\max_i x^{ij}} - \frac{1}{m} \sum_{i=1}^m \left(\frac{x^{ij}}{\max_i x^{ij}} \right) \right)^2}{m}} \quad (6)$$

Step 2.2: Values of the standard deviation calculated for the criteria are normalized with the following equation:

$$w_j^\sigma = \frac{\sigma_j}{\sum_{i=1}^n \sigma_j} \quad (7)$$

Step 2.3: Finally, the weights are adjusted with the following equation:

$$\hat{w}_j = \frac{\sqrt{w_j^\sigma \cdot w_j}}{\sum_{i=1}^n \sqrt{w_j^\sigma \cdot w_j}} \quad (8)$$

Step 3: Calculating the aggregation model

Three aggregation functions (CCM, UCM, and ICM) are calculated separately for each alternative.

The CCM (Complete Compensation Model) is calculated using the following equation:

$$u_1(a_i) = \sum_{j=1}^n \frac{\hat{w}_j \cdot \hat{x}_{ij}^{1N}}{\max_i \hat{x}_{ij}^{1N}} \quad (9)$$

The UCM (Uncompensatory Model) is calculated using the following equation:

$$u_2(a_i) = \max_j \hat{w}_j \left(\frac{1 - \hat{x}_{ij}^{1N}}{\max_i \hat{x}_{ij}^{1N}} \right) \quad (10)$$

The ICM (Incomplete Compensation Model) is calculated using the following equation:

$$u_3(a_i) = \prod_{j=1}^n \left(\frac{\hat{x}_{ij}^{2N}}{\max_i \hat{x}_{ij}^{2N}} \right)^{\hat{w}_j} \quad (11)$$

Step 4: Integration of utility values

The calculated utility functions are integrated with the following equation using the Euclidean distance principle:

$$DN_i = w_1 \sqrt{\varphi \left(\frac{u_1(a_i)}{\max_i u_1(a_i)} \right)^2 + (1 - \varphi) \left(\frac{m - r_1(a_i) + 1}{m} \right)^2} - w_2 \sqrt{\varphi \left(\frac{u_2(a_i)}{\max_i u_2(a_i)} \right)^2 + (1 - \varphi) \left(\frac{r_2(a_i)}{m} \right)^2} + w_3 \sqrt{\varphi \left(\frac{u_3(a_i)}{\max_i u_3(a_i)} \right)^2 + (1 - \varphi) \left(\frac{m - r_3(a_i) + 1}{m} \right)^2} \quad (12)$$

In this case, the means $r_1(a_i)$ and $r_3(a_i)$ represent the ordinal number of the alternative a_i sorted by CCM and ICM functions in descending value (higher value first). On the other hand, $r_2(a_i)$ shows the sequence number in the obtained order according to the increasing value (smaller value first) for the UCM function used. The label φ is the relative importance of the child value used and is in the range [0.1]. It is considered that it can be taken as $\varphi=0.5$. The coefficients w_1, w_2, w_3 are obtained weights of the used functions CCM, UCM, and ICM, respectively. The sum should be equal to $w_1 + w_2 + w_3 = 1$. When determining the weights, if the decision maker attaches importance to a wider range of performance alternatives, they can set a higher value for w_1 . In case the decision maker is not willing to take risks, i.e., to choose a poor alternative according to some criterion, they can assign a higher weight to w_2 . However, the decision maker may assign a greater weight to w_3 if he simultaneously considers overall performance and risk. Finally, the DN values are sorted in descending order, with the higher-value alternatives being the best.

2. Results and Discussion

Table 1 shows indicators of the quality of assets of the banking sector in Serbia as criteria, alternatives (observed years), and original initial data. The data are given for the period 2008 – 2023.

Table 1 - Asset Quality Indicators of the Banking Sector in Serbia (data in the table are in percentages)

	Problem loans about total loans	Sectoral distribution of total loans - Banks	Sectoral distribution of total loans - NBS	Sectoral distribution of total loans - Public sector	Sectoral distribution of total loans - Other financial organizations	Sectoral distribution of total loans - Economy	Sectoral distribution of total loans - Population and NIPUS (non-profit institutions that provide services to the population)	Sectoral distribution of total loans - Population and NIPUS of which: housing loans	Sectoral distribution of total loans - Foreign sector	Correction of the value of non-performing loans about gross non-performing loans	Correction of the value of total loans about gross problematic loans	Correction of the value of total loans about total gross loans
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
A1 - 2008	11.3	1.1	6.6	0.9	0.7	52.4	35.3	13.9	2.8	56.9	73.2	8.2
A2 - 2009	15.7	0.6	10.9	1.7	0.5	53.3	32.2	13.7	0.8	50.9	61.4	9.6
A3 - 2010	16.9	0.1	2.8	3.5	1.2	57	33.3	15.4	2	47.2	53.9	9.1
A4 - 2011	19	0.1	6.5	3.4	1.6	54.9	31.9	15	1.6	51	57	10.8
A5 - 2012	18.6	0.3	2.1	3	1.6	58.2	33	16.1	1.9	50	54.9	10.2
A6 - 2013	21.4	0.3	5.8	2.3	1.6	54.1	34.8	16.8	1.1	50.9	55.8	11.9
A7 - 2014	21.5	0.8	0.4	2.3	0.5	56.3	38.3	18	1.4	54.9	59	12.7
A8 - 2015	21.6	0.1	1.6	1.7	0.7	55.9	39.1	18.1	0.9	62.3	66.8	14.4
A9 - 2016	17	0.5	1.7	1.5	0.9	52.6	41.5	17.9	1.4	67.8	72.9	12.4
A10 - 2017	9.8	0.3	2.1	1.3	0.9	50.5	42.9	16.9	2	58.1	66.8	6.6

A11- 2018	5.7	0.4	0.7	1.1	0.8	50	44.3	16.8	2.6	60.2	78.7	4.5
A12- 2019	4.1	0.4	2.8	1.5	0.8	49.2	43.8	15.8	1.5	61.5	84.2	3.4
A13- 2020	3.7	0.3	1.1	1.6	0.8	49.6	45	16.4	1.6	59	93.4	3.5
A14- 2021	3.6	0	1.5	1.7	0.6	49.3	45	17.4	1.9	56.3	88.5	3.2
A15 - 2022	3.0	0.7	3.3	2.2	1.1	47.6	43.2	17.4	2.0	58.1	102.5	3.1
A16 - 2023	3.2	0.2	11.0	2.7	1.0	43.4	39.4	15.5	2.3	60.5	101.0	3.2
Statistic												
N	Valid	16	16	16	16	16	16	16	16	16	16	16
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean	12.2563	.3875	3.8063	2.0250	.9563	52.1438	38.9375	16.3188	1.7375	56.6000	73.1250	7.9250
Median	13.5000	s.3000	2.4500	1.7000	.8500	52.5000	39.2500	16.6000	1.7500	57.5000	69.8500	8.6500
Std. Deviation	7.43998	.29411	3.39027	.78951	.37232	3.93530	4.89420	1.36441	.56318	5.48756	16.57325	3.99775
Minimum	3.00	.00	.40	.90	.50	43.40	31.90	13.70	.80	47.20	53.90	3.10
Maximum	21.60	1.10	11.00	3.50	1.60	58.20	45.00	18.10	2.80	67.80	102.50	14.40

Note: Author's statistics. Data for 2023 are given for the IV quarter.

Source: National Bank of Serbia. Key macroprudential indicators of the Republic of Serbia

Table 2 shows the correlation matrix of indicators (criteria) of asset quality in the banking sector in Serbia.

Table 2 - Correlation

Correlations													
		1	2	3	4	5	6	7	8	9	10	11	12
C1	Pearson Correlation	1	.001	-.011	.370	.298	.880**	-.721**	.065	-.532*	-.390	-.890**	.977**
	Sig. (2-tailed)		.998	.969	.158	.263	.000	.002	.812	.034	.135	.000	.000
	N	16	16	16	16	16	16	16	16	16	16	16	16
C2	Pearson Correlation	.001	1	.114	-.435	-.352	-.009	-.064	-.214	.216	.121	.052	.060
	Sig. (2-tailed)	.998		.675	.092	.181	.974	.815	.427	.421	.655	.849	.824
	N	16	16	16	16	16	16	16	16	16	16	16	16
C3	Pearson Correlation	-.011	.114	1	.195	.115	-.265	-.524*	-.731**	-.040	-.261	.035	-.039
	Sig. (2-tailed)	.969	.675		.468	.671	.320	.037	.001	.884	.329	.897	.886
	N	16	16	16	16	16	16	16	16	16	16	16	16
C4	Pearson Correlation	.370	-.435	.195	1	.675**	.353	-.588*	-.122	-.118	-.635**	-.342	.230
	Sig. (2-tailed)	.158	.092	.468		.004	.180	.017	.653	.664	.008	.195	.391
	N	16	16	16	16	16	16	16	16	16	16	16	16
C5	Pearson Correlation	.298	-.352	.115	.675**	1	.268	-.460	-.093	.040	-.454	-.324	.180
	Sig. (2-tailed)	.263	.181	.671	.004		.315	.073	.733	.883	.078	.221	.504
	N	16	16	16	16	16	16	16	16	16	16	16	16
C6	Pearson Correlation	.880**	-.009	-.265	.353	.268	1	-.654**	.010	-.382	-.525*	-.904**	.823**
	Sig. (2-tailed)	.000	.974	.320	.180	.315		.006	.972	.145	.037	.000	.000
	N	16	16	16	16	16	16	16	16	16	16	16	16
C7	Pearson Correlation	-.721**	-.064	-.524*	-.588*	-.460	-.654**	1	.570*	.214	.728**	.740**	-.625**
	Sig. (2-tailed)	.002	.815	.037	.017	.073	.006		.021	.425	.001	.001	.010
	N	16	16	16	16	16	16	16	16	16	16	16	16

C8	Pearson Correlation	.065	-.214	-.731**	-.122	-.093	.010	.570*	1	-.211	.466	.148	.137
	Sig. (2-tailed)	.812	.427	.001	.653	.733	.972	.021		.433	.069	.584	.612
	N	16	16	16	16	16	16	16	16	16	16	16	16
C9	Pearson Correlation	-.532*	.216	-.040	-.118	.040	-.382	.214	-.211	1	.067	.358	-.544*
	Sig. (2-tailed)	.034	.421	.884	.664	.883	.145	.425	.433		.806	.174	.029
	N	16	16	16	16	16	16	16	16	16	16	16	16
C10	Pearson Correlation	-.390	.121	-.261	-.635**	-.454	-.525*	.728**	.466	.067	1	.589*	-.203
	Sig. (2-tailed)	.135	.655	.329	.008	.078	.037	.001	.069		.806	.016	.451
	N	16	16	16	16	16	16	16	16	16	16	16	16
C11	Pearson Correlation	-.890**	.052	.035	-.342	-.324	-.904**	.740**	.148	.358	.589*	1	-.810**
	Sig. (2-tailed)	.000	.849	.897	.195	.221	.000	.001	.584	.174	.016		.000
	N	16	16	16	16	16	16	16	16	16	16	16	16
C12	Pearson Correlation	.977**	.060	-.039	.230	.180	.823**	-.625**	.137	-.544*	-.203	-.810**	1
	Sig. (2-tailed)	.000	.824	.886	.391	.504	.000	.010	.612	.029	.451	.000	
	N	16	16	16	16	16	16	16	16	16	16	16	16
*. Correlation is significant at the 0.05 level (2-tailed).													
**. Correlation is significant at the 0.01 level (2-tailed).													

Note: Author's calculation based on the data in Table 1.

In the specific case, there is, therefore, a strong correlation between criterion C1 - Problem loans compared to total loans and criterion C6 - Sectoral distribution of total loans - Economy, C7 - Sectoral distribution of total loans - Population and NIPUS (non-profit institutions that provide services to the population), C9 - Sectoral distribution of total loans - Sector abroad, C11 - Correction of the value of total loans about gross problematic loans and C12 - Correction of the value of total loans about total gross loans. Effective control of these indicators - criteria can significantly influence the size of problematic bank loans total loans in Serbia. The effects of this are the improvement of the quality of assets of the banking sector in Serbia.

Table 3 shows the procedure for determining the weight coefficients of the criteria using the LMAW method. Figure 1 shows the weighting coefficients of the criteria.

Table 3 - Determination of Weighting Coefficients of Criteria Using the LMAW Method

Prioritization Scale		
Linguistic Variables	Abbreviation	Prioritization
Low	AL	1
Very Low	VL	1.5
Low	L	2
Medium	M	2.5
Equal	E	3
Medium High	MH	3.5
High	H	4
Very High	VH	4.5
High	AH	5

KIND	1	1	1	1	1	1	1	1	1	1	1	1
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
E1	VH	AH	H	E	MH	MH	H	VH	E	H	VH	VH
E2	VH	VH	MH	H	H	MH	AH	AH	L	VH	AH	VH
E3	VH	MH	VH	AH	AH	H	E	E	H	H	VH	AH
E4	AH	E	E	VH	AH	E	AH	H	H	VH	AH	VH

YAIP	0.5											
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C1
R1	9	10	8	6	7	7	8	9	6	8	9	9
R2	9	9	7	8	8	7	10	10	4	9	10	9
R3	9	7	9	10	10	8	6	6	8	8	9	10
R4	10	6	6	9	10	6	10	8	8	9	10	9

Weight Coefficients Vector	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
W1j	0.089	0.093	0.084	0.072	0.078	0.078	0.084	0.089	0.072	0.084	0.089	0.089
W2j	0.087	0.087	0.077	0.083	0.083	0.077	0.092	0.092	0.055	0.087	0.092	0.087
W3j	0.087	0.077	0.087	0.091	0.091	0.082	0.071	0.071	0.082	0.082	0.087	0.091
W4j	0.091	0.071	0.071	0.087	0.091	0.071	0.091	0.082	0.082	0.087	0.091	0.087

Aggregated Fuzzy Vectors	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
W1j	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002
W2j	0.002	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.002
W3j	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002
W4j	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.002
SUM	0.008	0.007	0.006	0.007	0.007	0.006	0.007	0.007	0.005	0.007	0.008	0.008
Aggregated Weight Coefficient Vectors	0.0885	0.0818	0.0797	0.0831	0.0857	0.0772	0.0842	0.0832	0.0727	0.0851	0.0895	0.0885

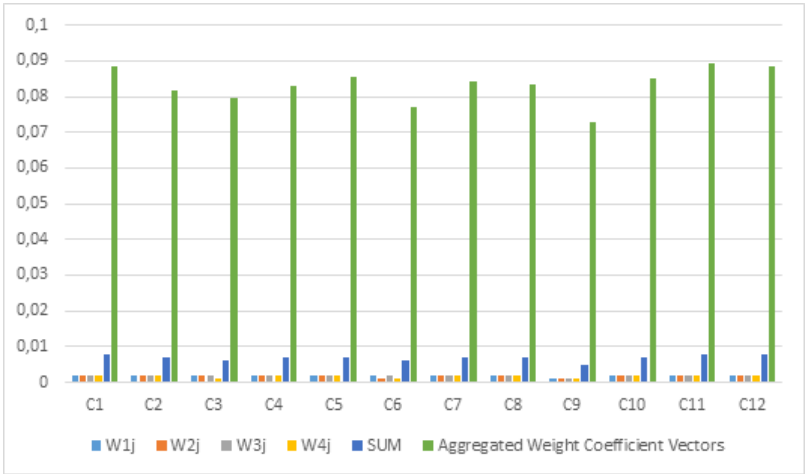


Figure 1. Weight coefficients of criteria
Source: Author's picture

Therefore, in this specific case, the most important criterion is C11 - Correction of the value of total loans compared to gross problematic loans. The following are C1 - Problem loans compared to total loans, C12 - Correction of the value of total loans compared to total gross loans, and other criteria. The quality of assets of the banking sector in Serbia can be significantly improved by effective control of problem loans and credit risk.

Annex Tables 4 - 10 show the procedure for determining the ranking of alternatives using the LMAW-DNMA method. Figure 2 shows the ranking of alternatives.

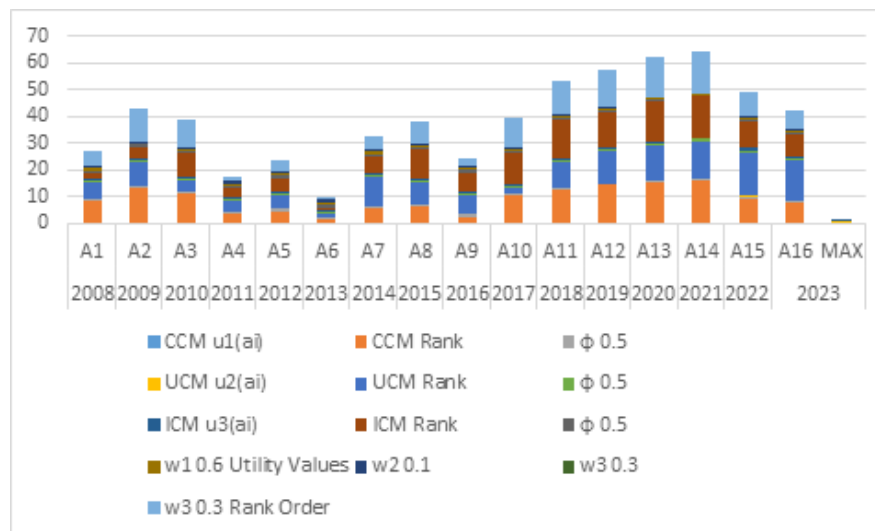


Figure 2. Ranking of Alternatives

Source: Author's picture

So, in this specific case, the best quality of assets of the banking sector in Serbia was achieved in 2013, and then in 2011, 2016, 2012, 2014, and the other observed years. In 2019, 2020, and 2021, the quality of assets of the banking sector in Serbia was adversely affected by the COVID-19 pandemic, which caused a decline in economic and therefore credit activities, and a significant prolongation of the repayment of credit obligations. To some extent, it was neutralized by the implementation of electronic banking. In 2022 and 2023, a certain improvement in the quality of banking sector assets in Serbia was recorded. Recently, the benchmark interest rate has been increased on several occasions to offset the negative effect of inflation, which certainly affected the quality of assets of the banking sector in Serbia. The quality of banking sector assets in Serbia was influenced by macroeconomic and microeconomic trends, i.e., geopolitical situation, economic activity, investments, foreign direct investments, monetary policy, tax policy, living standards of the population, and other controlled and uncontrolled factors. The asset quality of the banking sector in Serbia was adversely affected by the geopolitical situation and other controlled and uncontrolled factors. All in all, to achieve the target asset quality of the banking sector in Serbia, it is necessary, among other things, to manage credit risks as efficiently as possible and, consequently, to make an adequate distribution of available loans to the economy, sectors and the population as beneficiaries.

The applied research methodology in this study has certain limitations regarding the comparability of the results with other methods of multi-criteria decision-making, especially in the case when there are different methods for determining the weighting coefficients of the selected criteria. The applied research methodology in this study has certain limitations regarding the comparability of the results with other methods of multi-criteria decision-making, especially in the case when there are different methods for determining the weighting coefficients of the selected criteria.

Conclusion

Research into the quality of assets of the banking sector in Serbia using the LMAW-DNMA method showed that the highest quality assets of the banking sector in Serbia were in 2013, followed by: 2011, 2016, 2012, 2014, and other observed years. The quality of assets of the banking sector in Serbia in the period 2019-2021 was affected by the COVID-19 pandemic, causing a decline in economic and thus credit activities, and a significant prolongation of the repayment of credit obligations. Macroeconomic and microeconomic trends, geopolitical situation, economic activity, investments, foreign direct investments, monetary policy, fiscal policy, development of the capital and money market, living standards of the population, etc., also influenced the same. In 2022 and 2023, thanks to more efficient management of credit risks, a slight improvement was recorded in the quality of assets of the banking sector in Serbia. In addition, it is necessary, among other things, to achieve the target quality of assets of the banking sector in Serbia, to manage credit risks as efficiently as possible, and, accordingly, to make an adequate distribution of available loans to users (economy, sectors, population).

Literatura

1. Ali, S.M., Hoq, S.M.N., Bari, A.B.M.M., Kabir, G., & Paul, S.K. (2022). Evaluating factors contributing to the failure of information systems in the banking industry. *PLoS ONE*, 17(3): e0265674. <https://doi.org/10.1371/journal.pone.0265674>
2. Andersen, P., & Petersen, N.C. (1993). A procedure for ranking efficient units in data envelopment analysis. *Management Science*, 39, 1261-1264.
3. Amini, A., Alinezhad, A., & Yazdipoor, F. (2019). A TOPSIS, VIKOR, and DEA integrated evaluation method with belief structure under uncertainty to rank alternatives. *International Journal of Advanced Operations Management*, 11(3), 171-188.
4. Banker, R.D., Charnes, A., & Cooper, W.W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management Science*, 30(9), 1078-1092.
5. Božanić, D., Pamučar, D., Milić, A., Marinković, M., & Komazec, N. (2022). Modification of the Logarithm Methodology of Additive Weights (LMAW) by a Triangular Fuzzy Number and Its Application in Multi-Criteria Decision Making. *Axioms*, 11(3), 89. <https://doi.org/10.3390/axioms11030089>
6. Chang, X., & Wang, X. (2020). Research Performance Evaluation of University Based on Super DEA Model. 2020 IEEE 9th Joint International Information Technology and Artificial Intelligence Conference (ITAIC), 1252-1255. doi: 10.1109/ITAIC49862.2020.9339131
7. Chen, Chunhua, Liu, Haohua, Tang, Lijun & Ren, Jianwei. (2021). A Range Adjusted Measure of Super-Efficiency in Integer-Valued Data Envelopment Analysis with Undesirable Outputs. *Journal of Systems Science and Information*, 9(4), 378-398. <https://doi.org/10.21078/JSSI-2021-378-21>
8. Cvetkoska, V., & Savic, G. (2017). Efficiency of bank branches: Empirical evidence from a two-phase research approach. *Economic Research-Ekonomska istrazivanja*, 30(1), 318-333. doi:10.1080/1331677X.2017.1305775
9. Cvetkoska, V., & Cikovic, K.F. (2020). Assessing the relative efficiency of commercial banks in the Republic of North Macedonia: DEA window analysis. *Croatian Operational Research Review* 217 CRORR 11, 217-227.

10. Cvetkoska, V., Fotova Ciković, K., & Tasheva, M. (2021). Efficiency of Commercial Banking in Developing Countries. *Mathematic*, 9, 1597. <https://doi.org/10.3390/math9141597>
11. Demir, G. (2022). Analysis of the financial performance of the deposit banking sector in the COVID-19 period with LMAW-DNMA methods. *International Journal of Insurance and Finance*, 2(2), 17-36. <https://doi.org/10.52898/ijif.2022.7>
12. Ecer, F. (2020). Multi-criteria Decision-making comprehensive approach from past to present. Seçkin Publications.
13. Ecer, F., & Pamucar, P. (2022). A novel LOPCOW-DOBI multi-criteria sustainability performance assessment methodology: An application in developing country banking sector. *Omega*, 112, 102690. <https://doi.org/10.1016/j.omega.2022.102690>.
14. Fenyves, V., & Tarnóczy, T. (2020). Data envelopment analysis for measuring performance in a competitive market. *Problems and Perspectives in Management*, 18(1), 315-325. doi:10.21511/ppm.18(1).2020.27
15. Guo, D., & Cai, Z.Q. (2020). Super-Efficiency Infeasibility in the Presence of Nonradial Measurement. *Mathematical Problems in Engineering*, 2020, Article ID 6264852, 7 pages. <https://doi.org/10.1155/2020/6264852>
16. Hwang C.L., & Yoon K.S. (1981). Multiple attribute decision making: methods and applications. Berlin: Springer.
17. Hwang, C. L., & Yoon, K.P. (1995). Multiple Attribute Decision Making: An Introduction. Paperback / Sage Publications.
18. Lee, H.S., Chu, C.W. & J. Zhu, J. (2011). Super-efficiency DEA in the presence of infeasibility. *European Journal of Operational Research*, 212(1), 141-147.
19. Liao, H., & Wu, X. (2020). DNMA: A double normalization-based multiple aggregation method for multi-expert multi-criteria decision making. *Omega*, 94, 102058. <https://doi.org/10.1016/j.omega.2019.04.001>
20. Lin, R. (2020). Cross-efficiency evaluation capable of dealing with negative data: A directional distance function based approach. *Journal of the Operational Research Society*, 71(3), 505-516.
- Lukic, R., Sokic, M. & Vojteski Kljenak, D. (2017). Efficiency Analysis Of the Banking Sector In the Republic Of Serbia. *Business Excellence and Management*, 7(4), 5-17.
21. Lukić, R. (2018a). Bankarsko računovodstvo. Beograd: Ekonomski fakultet.
22. Lukic, R. (2018d). Analysis of the efficiency of insurance companies. In: Insurance in the post-crisis era, Belgrade: Faculty of Economics, University of Belgrade. ISBN: 978-86-403-1548-7.
23. Lukic, R., & Hadrovic Zekic, B. (2019). Evaluation of the efficiency of trade companies in Serbia using the DEA approach. *Proceedings of the 19th International Scientific Conference Business logistics in modern management* October 10-11, Osijek, Croatia, Josip Juraj Strossmayer, 145-162.
24. Lukic, R., & Hadrovic Zekic, B. (2019). Evaluation of the efficiency of trade companies in Serbia using the DEA approach. *Proceedings of the 19th International Scientific Conference Business logistics in modern management* October 10-11, Osijek, Croatia, Josip Juraj Strossmayer, 145-162.
25. Lukic, R. (2021). Application of the EDAS method in the evaluation of bank efficiency in Serbia. *Bankarstvo - Banking*, 50(2), 13-24. doi: 10.5937/bankarstvo2102064L
26. Lukić, R. (2022a). Evaluation of the efficiency of banks in Serbia using the MABAC method. *Bankarstvo - Banking*, 2, 35-60. DOI: 10.5937/bankarstvo2202010L
27. Lukić, R. (2022b). Analysis of financial performance and efficiency of banks in Serbia using fuzzy LMAW and MARCOS methods. *Bankarstvo - Banking*, 4, 130-169.
28. Lukic, R. (2023a). Merenje i analiza dinamike profitabilnosti bankarskog sektora u Srbiji na bazi FLMAW-MARCOS metoda. Measurement and Analysis of Profitability Dynamics of the Banking

- Sector in Serbia Based on the FLMAW-MARCOS Method. *Banking – Bankarstvo*, 8-47. DOI: 10.5937/bankarstvo2301028L
29. Lukić, R. (2023b). Analysis of the performance of companies in Serbia listed on the Belgrade stock exchange. *Zbornik radova/Conference Proceedings, Računovodstvo i revizija u teoriji i praksi/Accounting and audit in theory and practice*, Banja Luka College / *Besjeda Banja Luka*, 5(5), 69-80. DOI 10.7251/ZRRRTP2301069L
 30. Lukić, R. (2023c). Application of PROMETHEE Method in Evaluation of Insurance Efficiency in Serbia. *Revija za ekonomske in poslovne vede, Journal of Economic and Business Sciences*, 10(1), 3-19. DOI: <https://doi.org/10.55707/eb.v10i1.121>
 31. Lukic, R. (2023d). Application of the LMAW-DNMA method in the evaluation of the environmental problem in the agriculture of selected European Union countries. *Acta Agriculturae Serbica*, 28 (55), 49-61. doi: 10.5937/AASer2355049L
 32. Lukić, R. (2023e). Analysis of the liquidity dynamics of the banking sector in Serbia based on the TOPSIS method. *Bankarstvo-Banking*, 2-3, 28-35. DOI: 10.5937/bankarstvo2302008L
 33. Lukić, B. (2023f). Analysis of the dynamics of the capital adequacy of the bank sector in Serbia based on the LMAW-DNMA method. *Bankarstvo*, Vol. 52, Issue 4, 35-69. DOI: 10.5937/bankarstvo2304035L
 34. Lukić, R. (2023g). Analysis of the performance of insurance companies in Serbia based on the AHP-TOPSIS method analysis of the performance of insurance companies in Serbia based on the ahp-topsis method. *Marsonia: časopis za društvena i humanistička istraživanja • God. 2, br. 2, 2023.*, pp. 21-35.
 35. Lukić, R. (2023h). Analysis Of The Efficiency Of Insurance Companies In Serbia. *Revija za ekonomske in poslovne vede*, 10 (2), 47-64. DOI: <https://doi.org/10.55707/eb.v10i2.128>
 36. Maletić, R., Kreća, M., & Maletić, P. (2013). Application of DEA methodology in measuring efficiency in the banking sector. *Economics of Agriculture*, 60(4), 843-855. <https://www.ea.bg.ac.rs/index.php/EA/article/view/423>
 37. Milenkovic, N., Radovanov, B., Kalaš, B., & Horvat, A.M. (2022). External Two-Stage DEA Analysis of Bank Efficiency in West Balkan Countries. *Sustainability*, 14, 978. <https://doi.org/10.3390/su14020978>
 38. Pamučar, D., Žižović, M., Biswas, S., & Božanić, D. (2021). A new logarithm methodology of additive weights (LMAW) for multi-criteria decision-making: Application in logistics. *Facta Univ. Ser. Mech. Eng.*, 2021, 19, 361-380. <https://doi.org/10.22190/FUME210214031P>
 39. Puška, A., Božanić, D., Nedeljković, M., & Janošević, M. (2022). Green Supplier Selection in an Uncertain Environment in Agriculture Using a Hybrid MCDM Model: Z-Numbers-Fuzzy LMAW-Fuzzy CRADIS Model. *Axioms*, 11, 427. <https://doi.org/10.3390/axioms1109042>
 40. Pendharkar, P.C. (2021). Hybrid radial basis function DEA and its applications to regression, segmentation, and cluster analysis problems. *Machine Learning with Applications*, 6, 100092. <https://doi.org/10.1016/j.mlwa.2021.100092>
 41. Peykani, P., Seyed Esmaeili, F.S., Mirmozaffari, M., Jabbarzadeh, A., & Khamechian, M. (2022). Input/Output Variables Selection in Data Envelopment Analysis: A Shannon Entropy Approach. *Mach. Learn. Knowl. Extr.*, 4, 688-699. <https://doi.org/10.3390/make4030032>
 42. Peykani, P., Gheidar-Kheljani, J., Farzipoor Saen, R., & Mohammadi, E. (2022a). Generalized Robust Window Data Envelopment Analysis Approach for Dynamic Performance Measurement under Uncertain Panel Data. *Operational Research*, 1-36. <https://doi.org/10.1007/s12351-022-00729-7>
 43. Podinovski, V.V., & Bouzdine-Chameeva, T. (2021). Optimal solutions of multiplier DEA models. *J Prod Anal*, 56, 45-68. <https://doi.org/10.1007/s11123-021-00610-3>
 44. Radojicic, M., Savic, G., & Jeremic, V. (2018). Measuring the efficiency of banks: the bootstrapped I-distance GAR DEA approach. *Technological and Economic Development of Economy*, 24(4), 1581-1605. <https://doi.org/10.3846/tede.2018.3699>

45. Rose, P. (1996). *Commercial Bank Management*. Chicago: IRWIN.
46. Rostamzadeh, R., Akbarian, O., Banaitis, A., & Soltani, Z. (2021). Application of DEA in benchmarking: a systematic literature review from 2003–2020. *Technological and Economic Development of Economy*, 27(1), 175-222. <https://doi.org/10.3846/tede.2021.13406>
47. Savić, G., Radosavljević, M., & Ilievski, D. (2012). DEA Window analysis approach for measuring the efficiency of Serbian banks. *Management - časopis za teoriju i praksu menadžmenta*, 17(65), 5-14.
48. Saaty, T. L. (2008). Decision Making With The Analytic Hierarchy Process. *Int J Serv Sci*, 1(1), 83-98. <https://doi.org/10.1504/IJSSCI.2008.017590>
49. Stević, Ž., Pamučar, D., Puška, A., & Chatterjee, P. (2020). Sustainable supplier selection in health-care industries using a new MCDM method: Measurement of alternatives and ranking according to COMpromise solution (MARCOS). *Computers & Industrial Engineering*, 140, 106231. <https://doi.org/10.1016/j.cie.2019.106231>.
50. Stević, Ž., & Brković, N. A. (2020). Novel Integrated FUCOM-MARCOS Model for Evaluation of Human Resources in a Transport Company. *Logistics*, 4, 4. <https://doi.org/10.3390/logistics4010004>
51. Tone, K. (2002). A slacks-based measure of super-efficiency in data envelopment analysis. *European Journal of Operational Research*, 143, 32-41.
52. Tsai, Chi-Mao; Lee, Hsuan-Shih; & Gan, Guo-Ya (2021). A New Fuzzy DEA Model for Solving the MCDM Problems in Supplier Selection. *Journal of Marine Science and Technology*: 29(1), Article 7DOI: 10.51400/2709-6998.1006
53. Üçüncü, T., Akyüz, K. C., Akyüz, İ., Bayram, B. Ç., & Ve Ersen, N. (2018). Evaluation Of Financial Performance Of Paper Companies Traded At BIST With TOPSIS Method. *Kastamonu University Journal Of ForestryFaculty*, 18(1), 92-98.
54. Ünlü, U., Yalçın, N., & Avşarlıgil, N. (2022). Analysis of Efficiency and Productivity of Commercial Banks in Turkey Pre-and During COVID-19 with an Integrated MCDM Approach. *Mathematics*, 10(13), 2300. <https://doi.org/10.3390/math10132300>.

Annex

Table 4 - Initial matrix

Initial Matrix	Kind	1	1	1	1	1	1	1	1	1	1	1	1
	Weight	0.0885	0.0818	0.0797	0.0831	0.0857	0.0772	0.0842	0.0832	0.0727	0.0851	0.0895	0.0885
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
	A1	11.3	1.1	6.6	0.9	0.7	52.4	35.3	13.9	2.8	56.9	73.2	8.2
	A2	15.7	0.6	10.9	1.7	0.5	53.3	32.2	13.7	0.8	50.9	61.4	9.6
	A3	16.9	0.1	2.8	3.5	1.2	57	33.3	15.4	2	47.2	53.9	9.1
	A4	19	0.1	6.5	3.4	1.6	54.9	31.9	15	1.6	51	57	10.8
	A5	18.6	0.3	2.1	3	1.6	58.2	33	16.1	1.9	50	54.9	10.2
	A6	21.4	0.3	5.8	2.3	1.6	54.1	34.8	16.8	1.1	50.9	55.8	11.9
	A7	21.5	0.8	0.4	2.3	0.5	56.3	38.3	18	1.4	54.9	59	12.7
	A8	21.6	0.1	1.6	1.7	0.7	55.9	39.1	18.1	0.9	62.3	66.8	14.4
	A9	17	0.5	1.7	1.5	0.9	52.6	41.5	17.9	1.4	67.8	72.9	12.4
	A10	9.8	0.3	2.1	1.3	0.9	50.5	42.9	16.9	2	58.1	66.8	6.6
	A11	5.7	0.4	0.7	1.1	0.8	50	44.3	16.8	2.6	60.2	78.7	4.5
	A12	4.1	0.4	2.8	1.5	0.8	49.2	43.8	15.8	1.5	61.5	84.2	3.4
	A13	3.7	0.3	1.1	1.6	0.8	49.6	45	16.4	1.6	59	93.4	3.5
	A14	3.6	0	1.5	1.7	0.6	49.3	45	17.4	1.9	56.3	88.5	3.2
	A15	3	0.7	3.3	2.2	1.1	47.6	43.2	17.4	2	58.1	102.5	3.1
	A16	3.2	0.2	11	2.7	1	43.4	39.4	15.5	2.3	60.5	101	3.2
	MAX	21.6000	1.1000	11.0000	3.5000	1.6000	58.2000	45.0000	18.1000	2.8000	67.8000	102.5000	14.4000
	MIN	3.0000	0.0000	0.4000	0.9000	0.5000	43.4000	31.9000	13.7000	0.8000	47.2000	53.9000	3.1000

Table 5 - Linear normalized matrix

Linear Normalization Matrix		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0.4462	1.0000	0.5849	0.0000	0.1818	0.6081	0.2595	0.0455	1.0000	0.4709	0.3971	0.4513	1.0000
	A2	0.6828	0.5455	0.9906	0.3077	0.0000	0.6689	0.0229	0.0000	0.0000	0.1796	0.1543	0.5752	0.9906
	A3	0.7473	0.0909	0.2264	1.0000	0.6364	0.9189	0.1069	0.3864	0.6000	0.0000	0.0000	0.5310	1.0000
	A4	0.8602	0.0909	0.5755	0.9615	1.0000	0.7770	0.0000	0.2955	0.4000	0.1845	0.0638	0.6814	1.0000
	A5	0.8387	0.2727	0.1604	0.8077	1.0000	1.0000	0.0840	0.5455	0.5500	0.1359	0.0206	0.6283	1.0000
	A6	0.9892	0.2727	0.5094	0.5385	1.0000	0.7230	0.2214	0.7045	0.1500	0.1796	0.0391	0.7788	1.0000
	A7	0.9946	0.7273	0.0000	0.5385	0.0000	0.8716	0.4885	0.9773	0.3000	0.3738	0.1049	0.8496	0.9946
	A8	1.0000	0.0909	0.1132	0.3077	0.1818	0.8446	0.5496	1.0000	0.0500	0.7330	0.2654	1.0000	1.0000
	A9	0.7527	0.4545	0.1226	0.2308	0.3636	0.6216	0.7328	0.9545	0.3000	1.0000	0.3909	0.8230	1.0000
	A10	0.3656	0.2727	0.1604	0.1538	0.3636	0.4797	0.8397	0.7273	0.6000	0.5291	0.2654	0.3097	0.8397
	A11	0.1452	0.3636	0.0283	0.0769	0.2727	0.4459	0.9466	0.7045	0.9000	0.6311	0.5103	0.1239	0.9466
	A12	0.0591	0.3636	0.2264	0.2308	0.2727	0.3919	0.9084	0.4773	0.3500	0.6942	0.6235	0.0265	0.9084
	A13	0.0376	0.2727	0.0660	0.2692	0.2727	0.4189	1.0000	0.6136	0.4000	0.5728	0.8128	0.0354	1.0000
	A14	0.0323	0.0000	0.1038	0.3077	0.0909	0.3986	1.0000	0.8409	0.5500	0.4417	0.7119	0.0088	1.0000
	A15	0.0000	0.6364	0.2736	0.5000	0.5455	0.2838	0.8626	0.8409	0.6000	0.5291	1.0000	0.0000	1.0000
	A16	0.0108	0.1818	1.0000	0.6923	0.4545	0.0000	0.5725	0.4091	0.7500	0.6456	0.9691	0.0088	1.0000

Table 6 - Vector of the normalized matrix

Vector Normalization Matrix		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0.8307	1.0000	0.8080	0.7216	0.7950	0.9733	0.9406	0.9382	1.0000	0.9541	0.9074	0.8373	1.0000
	A2	0.9030	0.7744	0.9956	0.8073	0.7494	0.9774	0.9216	0.9352	0.7437	0.9288	0.8701	0.8740	0.9956
	A3	0.9227	0.5487	0.6422	1.0000	0.9089	0.9945	0.9283	0.9603	0.8975	0.9132	0.8465	0.8609	1.0000
	A4	0.9573	0.5487	0.8036	0.9893	1.0000	0.9848	0.9197	0.9544	0.8462	0.9292	0.8562	0.9055	1.0000
	A5	0.9507	0.6390	0.6116	0.9465	1.0000	1.0000	0.9265	0.9706	0.8847	0.9250	0.8496	0.8898	1.0000
	A6	0.9967	0.6390	0.7731	0.8715	1.0000	0.9811	0.9375	0.9809	0.7822	0.9288	0.8525	0.9344	1.0000
	A7	0.9984	0.8646	0.5375	0.8715	0.7494	0.9912	0.9590	0.9985	0.8206	0.9456	0.8626	0.9554	0.9985
	A8	1.0000	0.5487	0.5898	0.8073	0.7950	0.9894	0.9639	1.0000	0.7565	0.9768	0.8872	1.0000	1.0000
	A9	0.9244	0.7292	0.5942	0.7858	0.8405	0.9742	0.9786	0.9971	0.8206	1.0000	0.9065	0.9475	1.0000
	A10	0.8060	0.6390	0.6116	0.7644	0.8405	0.9645	0.9871	0.9823	0.8975	0.9591	0.8872	0.7953	0.9871
	A11	0.7386	0.6841	0.5506	0.7430	0.8178	0.9622	0.9957	0.9809	0.9744	0.9680	0.9248	0.7402	0.9957
	A12	0.7123	0.6841	0.6422	0.7858	0.8178	0.9585	0.9926	0.9661	0.8334	0.9734	0.9422	0.7113	0.9926
	A13	0.7057	0.6390	0.5680	0.7965	0.8178	0.9604	1.0000	0.9750	0.8462	0.9629	0.9712	0.7139	1.0000
	A14	0.7041	0.0000	0.5855	0.8073	0.7722	0.9590	1.0000	0.9897	0.8847	0.9515	0.9558	0.7061	1.0000
	A15	0.6942	0.8195	0.6640	0.8608	0.8861	0.9512	0.9890	0.9897	0.8975	0.9591	1.0000	0.7034	1.0000
	A16	0.6975	0.5938	1.0000	0.9143	0.8633	0.9318	0.9657	0.9617	0.9359	0.9692	0.9953	0.7061	1.0000
	Adj Wj	0.1179	0.0968	0.1058	0.0924	0.0954	0.0488	0.0646	0.0535	0.0817	0.0560	0.0812	0.1058	

Table 7 - CCM (Complete Compensation Model)

CCM (Complete Compensatory Model)	uI(ai)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	SUM
	A1	0.0526	0.0968	0.0619	0.0000	0.0173	0.0297	0.0168	0.0024	0.0817	0.0264	0.0323	0.0478	0.4656
	A2	0.0813	0.0533	0.1058	0.0287	0.0000	0.0329	0.0015	0.0000	0.0000	0.0102	0.0127	0.0615	0.3878
	A3	0.0881	0.0088	0.0240	0.0924	0.0607	0.0448	0.0069	0.0207	0.0490	0.0000	0.0000	0.0562	0.4516
	A4	0.1014	0.0088	0.0609	0.0889	0.0954	0.0379	0.0000	0.0158	0.0327	0.0103	0.0052	0.0721	0.5294
	A5	0.0989	0.0264	0.0170	0.0747	0.0954	0.0488	0.0054	0.0292	0.0449	0.0076	0.0017	0.0665	0.5164
	A6	0.1166	0.0264	0.0539	0.0498	0.0954	0.0353	0.0143	0.0377	0.0122	0.0101	0.0032	0.0824	0.5372
	A7	0.1179	0.0708	0.0000	0.0500	0.0000	0.0428	0.0317	0.0525	0.0246	0.0211	0.0086	0.0904	0.5104
	A8	0.1179	0.0088	0.0120	0.0284	0.0173	0.0412	0.0355	0.0535	0.0041	0.0411	0.0216	0.1058	0.4872
	A9	0.0887	0.0440	0.0130	0.0213	0.0347	0.0303	0.0474	0.0510	0.0245	0.0560	0.0318	0.0871	0.5299
	A10	0.0513	0.0315	0.0202	0.0169	0.0413	0.0279	0.0646	0.0463	0.0583	0.0353	0.0257	0.0390	0.4584
	A11	0.0181	0.0372	0.0032	0.0075	0.0275	0.0230	0.0646	0.0398	0.0776	0.0374	0.0438	0.0139	0.3935
	A12	0.0077	0.0388	0.0264	0.0235	0.0286	0.0210	0.0646	0.0281	0.0315	0.0428	0.0557	0.0031	0.3718
	A13	0.0044	0.0264	0.0070	0.0249	0.0260	0.0204	0.0646	0.0328	0.0327	0.0321	0.0660	0.0037	0.3411
	A14	0.0038	0.0000	0.0110	0.0284	0.0087	0.0194	0.0646	0.0450	0.0449	0.0248	0.0578	0.0009	0.3094
	A15	0.0000	0.0616	0.0290	0.0462	0.0520	0.0138	0.0557	0.0450	0.0490	0.0297	0.0812	0.0000	0.4632
	A16	0.0013	0.0176	0.1058	0.0640	0.0433	0.0000	0.0370	0.0219	0.0612	0.0362	0.0787	0.0009	0.4680

Table 8 - UCM (Uncmpensatory Model)

UCM (Uncomp- ensatory Model)	u2(ai)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0.0653	0.0000	0.0439	0.0924	0.0780	0.0191	0.0478	0.0510	0.0000	0.0297	0.0490	0.0581	0.0924
	A2	0.0366	0.0435	0.0000	0.0637	0.0954	0.0158	0.0631	0.0535	0.0817	0.0459	0.0686	0.0444	0.0954
	A3	0.0298	0.0880	0.0819	0.0000	0.0347	0.0040	0.0577	0.0328	0.0327	0.0560	0.0812	0.0496	0.0880
	A4	0.0165	0.0880	0.0449	0.0036	0.0000	0.0109	0.0646	0.0377	0.0490	0.0457	0.0760	0.0337	0.0880
	A5	0.0190	0.0704	0.0889	0.0178	0.0000	0.0000	0.0592	0.0243	0.0367	0.0484	0.0796	0.0393	0.0889
	A6	0.0013	0.0704	0.0519	0.0427	0.0000	0.0135	0.0503	0.0158	0.0694	0.0460	0.0781	0.0234	0.0781
	A7	0.0000	0.0260	0.1058	0.0424	0.0954	0.0060	0.0329	0.0009	0.0570	0.0350	0.0727	0.0154	0.1058
	A8	0.0000	0.0880	0.0938	0.0640	0.0780	0.0076	0.0291	0.0000	0.0776	0.0150	0.0597	0.0000	0.0938
	A9	0.0292	0.0528	0.0929	0.0711	0.0607	0.0185	0.0173	0.0024	0.0572	0.0000	0.0495	0.0187	0.0929
	A10	0.0666	0.0654	0.0856	0.0755	0.0541	0.0209	0.0000	0.0072	0.0233	0.0207	0.0556	0.0668	0.0856
	A11	0.0998	0.0596	0.1027	0.0849	0.0679	0.0258	0.0000	0.0137	0.0040	0.0187	0.0374	0.0920	0.1027
	A12	0.1102	0.0581	0.0795	0.0690	0.0667	0.0277	0.0000	0.0254	0.0502	0.0132	0.0255	0.1027	0.1102
	A13	0.1135	0.0704	0.0988	0.0676	0.0693	0.0283	0.0000	0.0207	0.0490	0.0239	0.0152	0.1021	0.1135
	A14	0.1141	0.0000	0.0948	0.0640	0.0867	0.0293	0.0000	0.0085	0.0367	0.0313	0.0234	0.1049	0.1141
	A15	0.1179	0.0352	0.0769	0.0462	0.0433	0.0349	0.0089	0.0085	0.0327	0.0264	0.0000	0.1058	0.1179
	A16	0.1166	0.0792	0.0000	0.0284	0.0520	0.0488	0.0276	0.0316	0.0204	0.0199	0.0025	0.1049	0.1166

Table 9 - ICM (Incomplete Compensation Model)

	u3(ai)	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	MAX
	A1	0.9784	1.0000	0.9777	0.9703	0.9784	0.9987	0.9960	0.9966	1.0000	0.9974	0.9921	0.9814	0.8742
	A2	0.9886	0.9760	1.0000	0.9808	0.9733	0.9991	0.9950	0.9967	0.9765	0.9961	0.9891	0.9863	0.8659
	A3	0.9906	0.9435	0.9542	1.0000	0.9909	0.9997	0.9952	0.9978	0.9912	0.9949	0.9866	0.9843	0.8402
	A4	0.9949	0.9435	0.9771	0.9990	1.0000	0.9993	0.9946	0.9975	0.9865	0.9959	0.9875	0.9896	0.8721
	A5	0.9941	0.9576	0.9493	0.9949	1.0000	1.0000	0.9951	0.9984	0.9900	0.9956	0.9868	0.9877	0.8582
	A6	0.9996	0.9576	0.9731	0.9874	1.0000	0.9991	0.9958	0.9990	0.9801	0.9959	0.9871	0.9928	0.8744
	A7	1.0000	0.9862	0.9366	0.9875	0.9730	0.9996	0.9974	1.0000	0.9841	0.9970	0.9882	0.9953	0.8538
	A8	1.0000	0.9435	0.9457	0.9804	0.9784	0.9995	0.9976	1.0000	0.9775	0.9987	0.9903	1.0000	0.8250
	A9	0.9908	0.9699	0.9464	0.9780	0.9836	0.9987	0.9986	0.9998	0.9840	1.0000	0.9921	0.9943	0.8467
	A10	0.9764	0.9588	0.9506	0.9766	0.9848	0.9989	1.0000	0.9997	0.9923	0.9984	0.9914	0.9774	0.8204
	A11	0.9654	0.9643	0.9392	0.9733	0.9814	0.9983	1.0000	0.9992	0.9982	0.9984	0.9940	0.9691	0.7999
	A12	0.9616	0.9646	0.9550	0.9786	0.9817	0.9983	1.0000	0.9986	0.9858	0.9989	0.9958	0.9653	0.8030
	A13	0.9597	0.9576	0.9419	0.9792	0.9810	0.9980	1.0000	0.9986	0.9865	0.9979	0.9976	0.9650	0.7853
	A14	0.9595	0.0000	0.9449	0.9804	0.9757	0.9980	1.0000	0.9994	0.9900	0.9972	0.9963	0.9638	0.0000
	A15	0.9579	0.9809	0.9576	0.9862	0.9885	0.9976	0.9993	0.9994	0.9912	0.9977	1.0000	0.9635	0.8327
	A16	0.9584	0.9508	1.0000	0.9918	0.9861	0.9966	0.9977	0.9979	0.9946	0.9983	0.9996	0.9638	0.8459

Table 10 - Results of the LMAW-DNMA method

											w1	w2	w3	
											0.6	0.1	0.3	
		CCM		φ		UCM	φ		ICM	φ	Utility Values			Rank Order
		u1(ai)	Rank	0.5	u2(ai)	Rank	0.5	u3(ai)	Rank	0.5				
2008	A1	0.4656	8	0.7306	0.0924	6	0.6146	0.8742	2	0.9691	0.7905	0.7905		6
2009	A2	0.3878	13	0.5402	0.0954	9	0.6966	0.8659	4	0.9057	0.6655	0.6655		12
2010	A3	0.4516	11	0.6508	0.0880	4	0.5568	0.8402	9	0.7659	0.6759	0.6759		10
2011	A4	0.5294	3	0.9318	0.0880	4	0.5568	0.8721	3	0.9381	0.8962	0.8962		2
2012	A5	0.5164	4	0.8899	0.0889	5	0.5769	0.8582	5	0.8734	0.8537	0.8537		4
2013	A6	0.5372	1	1.0000	0.0781	1	0.4702	0.8744	1	1.0000	0.9470	0.9470		1
2014	A7	0.5104	5	0.8559	0.1058	11	0.7995	0.8538	6	0.8444	0.8468	0.8468		5
2015	A8	0.4872	6	0.8047	0.0938	8	0.6647	0.8250	11	0.7179	0.7647	0.7647		8
2016	A9	0.5299	2	0.9622	0.0929	7	0.6371	0.8467	7	0.8149	0.8855	0.8855		3
2017	A10	0.4584	10	0.6780	0.0856	2	0.5211	0.8204	12	0.6993	0.6687	0.6687		11
2018	A11	0.3935	12	0.5630	0.1027	10	0.7580	0.7999	14	0.6603	0.6117	0.6117		13
2019	A12	0.3718	14	0.5070	0.1102	12	0.8475	0.8030	13	0.6730	0.5909	0.5909		14
2020	A13	0.3411	15	0.4576	0.1135	13	0.8906	0.7853	15	0.6412	0.5560	0.5560		15
2021	A14	0.3094	16	0.4096	0.1141	14	0.9225	0.0000	16	0.0442	0.3513	0.3513		16
2022	A15	0.4632	9	0.7048	0.1179	16	1.0000	0.8327	10	0.7410	0.7452	0.7452		9
2023	A16	0.4680	7	0.7581	0.1166	15	0.9637	0.8459	8	0.7913	0.7886	0.7886		7
	MAX	0.5372			0.1179				0.8744					

Datum prijema: 01.08.2024. god.
Datum prihvatanja: 16.09.2024. god.

DOI: 10.5937/bankarstvo2403054L

UPRAVLJANJE TRANSFORMACIJOM BANKARSTVA VOĐENOM VEŠTAČKOM INTELIGENCIJOM: STUDIJA SLUČAJA JPMORGAN CHASE

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Rezime: Pojava onlajn banaka, BigTech i FinTech konkurenata usloвила je transformaciju bankarskog sektora, podstičući tradicionalne banke da primenjuju napredne tehnologije poput veštačke inteligencije kako bi očuvale konkurentnost. U radu je prikazana primena veštačke inteligencije u bankarskom sektoru, sa posebnim osvrtom na generativnu veštačku inteligenciju. Predstavljani su različiti načini na koje se veštačka inteligencija može primeniti za povećanje efikasnosti, unapređenje usluga i automatizaciju bankarskih procesa. U radu je predstavljena studija slučaja JPMorgan Chase, vodeće globalne finansijske institucije koja je uspešno integrisala veštačku inteligenciju u sve aspekte svog poslovanja. Pored toga, rad pruža pregled trenutnog stanja primene veštačke inteligencije u bankama u Srbiji, ukazujući na napredak koji je ostvarila Narodna banka Srbije i druge komercijalne banke. Ključni zaključak rada usmeren je na transformacioni potencijal veštačke inteligencije u bankarskom sektoru i njenu ulogu u oblikovanju budućnosti finansijskih usluga.

Ključne reči: veštačka inteligencija, bankarski sektor, digitalna transformacija, tehnološke inovacije, JPMorgan Chase, banke u Srbiji

JEL klasifikacija: O33, L86, G21

Uvod

Banke se kontinuirano prilagođavaju digitalnoj transformaciji društva uvodeći brojne inovativne proizvode i usluge (Šehović, 2017; Stojmenović, 2020). To uključuje bankomate, kreditne i debitne kartice, razne onlajn platne i investicione usluge, elektronske transfere sredstava, telefonsko i mobilno bankarstvo, mobilne aplikacije, digitalne novčanike i internet bankarstvo (Funcas, 2021). Iako je tehnologija bila sastavni deo bankarskog sektora još od sredine 20. veka, finansijski sektor prolazi kroz značajne promene zbog pojave inovativnih konkurenata, poslovnih modela, proizvoda i usluga. Premda su banke istorijski bile dosta vešte u integraciji novih tehnologija, trenutni ekosistem finansijskih usluga zahteva veći stepen transformacije (Omarini, 2024). U finansijskom sektoru se koristi mnoštvo novih tehnologija poput veštačke inteligencije, napredne analitike podataka, velikih podataka, distribuirane tehnologije glavne knjige, blokčejna, biometrije, identifikacije korisnika na daljinu, računarstva u oblaku, Web3 i metaverzuma (Nowakowski, 2024). Pored toga, pojavljuju se novi tipovi banaka - onlajn banke, koje posluju bez fizičkih ekspozitura. One su nastale kao posledica sve veće digitalizacije finansijskih usluga i namenjene su tehnološki naprednim klijentima koji preferiraju onlajn bankarstvo. Onlajn banke često nude značajne funkcije poput informativnih korisničkih interfejsa, brzog otvaranja računa i nižih naknada u poređenju sa tradicionalnim bankama. Cilj im je da pruže praktičnije i pristupačnije bankarsko iskustvo, posebno za milenijalce i mlađe generacije (Funcas, 2021). Kako bi ostale konkurentne sa novonastalim onlajn bankama i FinTech i BigTech kompanijama, tradicionalne banke moraju da prihvate i integrišu moderna tehnološka rešenja u svoje poslovanje (Waliszewski, 2024). Jedno od tih rešenja je veštačka inteligencija (u nastavku skraćeno VI). VI se odnosi na sposobnost kompjuterskih programa da stiču i primenjuju znanje bez ljudske intervencije. Sistemi VI posmatraju svet oko sebe, samostalno analiziraju informacije, izvode zaključke i preduzimaju odgovarajuće akcije. Oni uče iz svojih prethodnih procena i vremenom poboljšavaju svoje performanse (Kaya, 2019). VI obuhvata niz tehnologija koje omogućavaju mašinama da simuliraju ljudsku inteligenciju, kao što su učenje, rezonovanje, rešavanje problema, percepcija i razumevanje jezika (Ghandour, 2021). U kontekstu bankarstva, VI se odnosi na upotrebu računara i mašina za simuliranje ljudske inteligencije, posebno u analizi događaja i donošenju odluka. VI može da obavlja zadatke koji obično zahtevaju ljudsku inteligenciju, kao što su prepoznavanje obrazaca, učenje iz podataka, donošenje odluka i predviđanje (Boustani, 2022).

Predmet ovog rada je primena VI i generativne VI u bankarskom sektoru. Cilj rada je da na sveobuhvatan način istraži i ukaže na sve mogućnosti primene VI u bankama, uz konkretne primere banaka koje su u svom poslovanju primenile sisteme VI.

Ključna istraživačka pitanja (IP) su:

IP 1: U koje svrhe se VI primenjuje u bankarskom sektoru?

IP 2: Koje su ključne odluke koje treba doneti prilikom implementacije generativne VI u bankama?

IP 3: Koja banka je najnaprednija u primeni VI i koje su ključne primene VI u toj banci?

IP 4: U kojoj meri se VI primenjuje u bankama u Srbiji?

Ovaj rad pruža značajan doprinos za razumevanje uloge VI u bankarstvu, kroz jedinstven pregled novih tehnologija i konkretnih primera njihove primene u vodećim bankama poput JPMorgan Chase. Sa praktičnog aspekta, doprinos rada je u tome što ukazuje na nove smernice za implementaciju generativnog modela VI ukazujući na Evident VI indeks kao značajan i koristan alat za procenu zrelosti banaka u primeni VI u svom poslovanju. Samim tim, značaj ovog rada proizilazi iz prikaza i sinteze postojećih pristupa koje banke primenjuju u cilju razvoja efikasnih strategija i optimalnog korišćenja prednosti VI, postavljajući na taj način nove standarde u bankarskom sektoru.

Rad je strukturiran na sledeći način. Na početku su istaknuti ciljevi istraživanja, ključna istraživačka pitanja, kao i pregled literature koji je posvećen definisanju VI i generativne VI, kao i njenim raznovrsnim mogućnostima primene u bankarskom sektoru. Drugi deo rada je posvećen metodologiji istraživanja i rezultatima. Ukazano je na Evident VI indeks uz objašnjenje njegove strukture i rang liste deset vodećih banaka u primeni VI, a zatim je prikazana studija slučaja JPMorgan Chase kao najbolje rangirane finansijske institucije u pogledu primene VI. Na kraju rada prikazano je trenutno stanje razvoja i implementacije VI u bankarskom sektoru u Srbiji. U zaključku rada su, pored ključnih rezultata, prikazane teorijske i praktične implikacije, ograničenja i pravci za buduća istraživanja na ovu temu imajući u vidu transformativnu ulogu VI u bankarskom sektoru.

Pregled literature: veštačka inteligencija u bankarskom sektoru

VI može da se definiše kao naučno istraživanje računarskih principa koji stoje iza mišljenja i inteligentnog ponašanja (Skilton & Hovsepian, 2017). Ona predstavlja sposobnost računarskih sistema da se suoče sa složenim problemima, oponašaju reakcije slične ljudskim i ispoljavaju inteligentno ponašanje (Burgess, 2017). U suštini, VI predstavlja skup raznovrsnih tehnologija koje imaju brojne prednosti među kojima su: automatizacija procesa, poboljšanje procesa donošenja odluka, unapređenje korisničkog iskustva i ublažavanje rizika (Boustani, 2022). VI nije jedna tehnologija, već kombinacija različitih tehnologija koje se primenjuju na različite načine. Postoji nekoliko VI tehnologija koje se primenjuju u bankarstvu (Ghandour, 2021):

- Obrada prirodnog jezika i sistemi mašinskog učenja koji se koriste za automatizaciju interakcija sa korisnicima, analizu obrazaca potrošnje i izvršavanje finansijskih transakcija u ime klijenata.
- Sistemi analitike velikih podataka, podstaknuti VI i mašinskim učenjem koji se koriste za pružanje personalizovanih usluga i iskustava klijentima. Ovi sistemi koriste ogromne količine podataka o klijentima kako bi stekli uvid u njihove potrebe i ponašanja, omogućavajući bankama da prilagode proizvode i usluge u skladu sa tim.
- VI podstaknuta analitika velikih podataka takođe pomaže rukovodiocima i menadžerima u donošenju informisanih odluka u vezi sa internim procesima, operacijama, investicijama, rizicima i alokacijom resursa.
- Mašinsko učenje i prediktivna analitika koji se koriste za otkrivanje lažnih transakcija, obezbeđivanje usklađenosti sa internim politikama i propisima, poboljšanje bezbednosti transakcija i predviđanje budućih trendova.

Autori koji su se bavili primenom VI u jordanskim komercijalnim bankama identifikovali su tri sistema VI (Al-Hawamdeh & Alshaer, 2022):

- Ekspertski sistemi: Ovi sistemi čuvaju ljudsko znanje u računarima kako bi rešavali probleme koji obično zahtevaju stručnost ljudi. Oni simuliraju procese razmišljanja stručnjaka, ali ne mogu da uče iz iskustva. Ekspertski sistemi se koriste u bankarstvu za zadatke kao što su kreditno bodovanje, otkrivanje prevara i korisnička podrška.
- Sistemi neuronskih mreža: Ovi sistemi su modelirani po uzoru na neuronske mreže u ljudskom mozgu. Oni mogu da uče iz iskustva i prepoznaju obrasce, što ih čini korisnim za zadatke kao što su prepoznavanje slika, obrada prirodnog jezika i procena rizika.
- Sistemi fazi logike: Ovi sistemi mogu da obrađuju više vrednosti za istu promenljivu, omogućavajući im da reše probleme sa nizom podataka. Koriste se u bankarstvu za zadatke kao što su: odobravanje kredita, upravljanje portfoliom i finansijsko predviđanje.

U tabeli 1 je prikazana klasifikacija primene VI u bankama prema Nicoletti (2021).

Tabela 1 - Klasifikacija primene VI u bankama

VI komponenta	Vrsta
Probabilističko rezonovanje (Mašinsko učenje)	Neuronske mreže, prediktivna analitika
Računarska logika	Rešavanje problema zasnovano na pravilima, ekspertski sistemi, rešavanje problema zasnovano na ograničenjima, automatizovano rezonovanje
Pametni interfejsi	Obrada prirodnog jezika, četbotovi, kompjuterska vizija
Pametna automatizacija procesa	Kognitivne tehnologije, robotska automatizacija procesa, robotsko kretanje i manipulacija

Izvor: Prilagođeno prema Nicoletti, B. (2021). Banking 5.0. How Fintech will Change Traditional Banks in the "New Normal" Post Pandemic. Palgrave Studies in Financial Service Technology. Switzerland: Palgrave MacMillan.

Pregledom literature, može se zaključiti da se VI u bankarskom sektoru može primeniti za (Kaya, 2019; Nicoletti, 2021; Boustani, 2022; McMullen, 2023):

- **Otkrivanje i sprečavanje prevara:** Algoritmi VI analiziraju ogromne količine podataka o transakcijama u realnom vremenu. Učeći iz istorijskih obrazaca i identifikujući anomalije, VI može brzo da označi sumnjive aktivnosti, kao što su neobični iznosi potrošnje ili neuobičajene lokacije, što može ukazivati na prevanu. Ovo omogućava bankama da preduzmu hitne mere, kao što su blokiranje transakcija ili upozorenje klijenata, kako bi se sprečili finansijski gubici.
- **Naplata i povraćaj dugova:** VI nudi korisne opcije za naplatu i povraćaj dugova, naročito tokom ekonomskih kriza kada se povećava broj neizmirenih obaveza klijenata. Korišćenjem sistema ranog upozorenja i prediktivne analitike, banke mogu znatno da unaprede svoje rezultate u naplati dugova i na taj način mogu da ublaže finansijski rizik.
- **Pojednostavljen proces procene kreditnog rizika:** Korišćenjem modela mašinskog učenja i robotske automatizacije procesa, može se znatno pojednostaviti proces procene kreditnog rizika, posebno kod odobravanja onlajn kredita. Posledično, može se značajno smanjiti vreme koje je potrebno za donošenje odluka o odobravanju kredita.
- **Proces upoznavanja klijenata:** Poznavanje klijenata je ključni regulatorni zahtev za banke koje treba da provere identitet svojih klijenata i procene sve potencijalne rizike. Sistemi VI mogu da automatizuju i pojednostave ovaj proces tako što prikupljaju i proveravaju informacije iz različitih dokumenata, kao što su pasoši, vozačke dozvole i računi za komunalije. Algoritmi VI mogu da upoređuju podatke o klijentima sa eksternim izvorima, kao što su liste sankcija i liste za praćenje, kako bi identifikovali potencijalne rizike.
- **Četbotovi i virtuelni asistenti:** Četbotovi i virtuelni asistenti zasnovani na VI, doveli su do transformacije korisničke podrške u bankarstvu. Ovi inteligentni agenti mogu da obrade širok spektar upita klijenata, od osnovnih provera stanja na računu do kompleksnijih finansijskih saveta. Korišćenjem obrade prirodnog jezika i mašinskog učenja, četbotovi mogu da razumeju i odgovore na upite klijenata, pružajući brzu i efikasnu podršku 24 sata dnevno, 7 dana u nedelji. Ključne prednosti četbotova

su poboljšana korisnička usluga, personalizovano korisničko iskustvo, smanjeno vreme čekanja, smanjeni troškovi, kao i poboljšanje radnih uslova jer zaposleni u bankama mogu da posvete svoje vreme drugim, složenijim i kreativnijim zadacima i aktivnostima (Nicoletti, 2021).

- **Poboljšano korisničko iskustvo:** VI omogućava bankama da personalizuju svoje usluge prema potrebama i afinitetima klijenata. Četbotovi i aplikacije mogu da pruže personalizovane finansijske savete, podsetnike za plaćanje računa i lakši pristup informacijama o računu, čime se poboljšava celokupno korisničko iskustvo.
- **Robo-savetnici i personalizovano finansijsko planiranje:** Robo-savetnici su platforme VI koje nude automatizovane savete za ulaganje i upravljanje portfoliom. Analizirajući podatke o klijentima, kao što su tolerancija na rizik, finansijski ciljevi i preferencije za ulaganja, robo-savetnici mogu da kreiraju personalizovane investicione portfolije i daju preporuke prilagođene individualnim potrebama. Na ovaj način se demokratizuje pristup finansijskim savetima, jer oni postaju pristupačniji široj populaciji klijenata.
- **Analiza i ekstrakcija podataka:** Banke se suočavaju sa ogromnim količinama nestrukturiranih podataka, kao što su pravna dokumenta, ugovori i finansijski izveštaji. Alati zasnovani na VI mogu da analiziraju i izvlače vredne zaključke iz ovih podataka, automatizujući zadatke koji bi inače zahtevali značajan manuelni rad. Na primer, algoritmi VI mogu da identifikuju i izdvoje ključne klauzule iz pravnih dokumenata, da sumiraju finansijske izveštaje, pa čak i da predvide trendove na tržištu na osnovu vesti i sentimenta na društvenim mrežama.
- **Povećana efikasnost i produktivnost:** VI može da automatizuje rutinske zadatke, oslobađajući zaposlene da se fokusiraju na kompleksnije aktivnosti koje zahtevaju kreativnost. Procesom automatizacije mogu da se povećaju efikasnost i ukupna produktivnost banke.
- **Inovacije i konkurentska prednost:** Banke koje primenjuju VI mogu da razvijaju inovativne proizvode i usluge, izdvajajući se od konkurencije i održavajući vodeću poziciju na stalno promenljivom tržištu.
- **Demokratizacija finansijskih usluga:** VI čini finansijske usluge dostupnijim pojednostavljujući procese i smanjujući troškove. Na primer, robo-savetnici mogu da demokratizuju investicije u portfolije čineći ih pristupačnim svim onim klijentima koji ranije nisu mogli da se uključe u ove aktivnosti zbog visokih naknada.

Predstavljene mogućnosti za primenu VI pokazuju njen transformativni potencijal u bankarskom sektoru. Automatizacijom procesa, poboljšanjem procesa donošenja odluka i unapređenjem korisničkog iskustva, VI dovodi do revolucije u pogledu načina na koji banke posluju i pružaju finansijske usluge. Štaviše, VI ima potencijal da značajno utiče na profitabilnost banaka. VI tehnologije mogu da smanje troškove, posebno u oblastima kao što su ljudski resursi i operacije, i da doprinesu generisanju prihoda omogućavajući razvoj novih, personalizovanih proizvoda i usluga koje bolje zadovoljavaju potrebe klijenata. Empirijske studije ukazuju na pozitivnu korelaciju između usvajanja VI i profitabilnosti banke, što implicira da banke koje aktivno ulažu u tehnologije VI imaju tendenciju da budu profitabilnije. Samim tim, važnost implementacije VI za banke je od velikog značaja kako bi se suočile sa izazovima poput slabe profitabilnosti i ostale konkurentne u sve digitalnijem i podacima vođenom finansijskom okruženju (Kaya, 2019).

Generativna VI i ključne odluke prilikom njene implementacije u bankama

Generativna VI obuhvata kategoriju sistema VI koji su sposobni da stvaraju inovativan i jedinstven sadržaj. Ovi sistemi se tokom faze obuke izlažu velikim količinama podataka, što im omogućava da identifikuju i razumeju obrasce i strukture podataka. Po završetku obuke, ovi sistemi mogu da generišu novi sadržaj koji, iako nikada ranije nije viđen, ima sličnosti sa primerima na kojima su obučeni (Taulli, 2023).

Uvođenje generativne VI zahteva pažljivo razmatranje različitih ključnih oblasti koje su opisane u nastavku ovog rada (Buehler et al., 2024). Prvo, potrebno je da se definiše ko će predvoditi razvoj strategije za generativnu VI, da li će to biti centralizovani napor ili će razvoj strategije biti delegiran pojedinačnim poslovnim jedinicama. Ceo proces transformacije treba da obuhvati definisanje vizije za potencijalne prednosti koje generativna VI može doneti i identifikaciju funkcija i procesa koji će najverovatnije biti pod najvećim uticajem VI. Drugo, važno je odrediti ko ima autoritet da odluči koji delovi organizacije će koristiti generativnu VI i koji specifični slučajevi upotrebe unutar tih delova će imati prioritet. Na taj način se osigurava usklađenost između mogućnosti tehnologije i ciljeva organizacije. Treće, važno je odabrati najprikladniji pristup implementacije generativne VI. To može uključivati nabavku ciljanih rešenja, integraciju sveobuhvatnijih postojećih rešenja ili razvoj sopstvenih rešenja. Svaki model ima svoje prednosti i implikacije za resurse, kontrolu i prilagođavanje. Četvrto, važno je doneti odluke o mehanizmu finansiranja inicijativa za generativnu VI i razmotriti da li će finansiranje biti centralizovano ili decentralizovano, usklađujući odluku sa celokupnim pristupom usvajanju generativne VI unutar organizacije. Peto, potrebno je planirati ljudske resurse i identifikovati neophodne veštine za uspešnu implementaciju generativne VI. To može uključivati zapošljavanje novih talenata, obučavanje postojećih zaposlenih ili angažovanje eksternih izvršilaca za specifične zadatke. Šesto, važno je uspostaviti jasne mere zaštite od rizika, kao što su zaštita podataka o privatnosti i intelektualne svojine, i odrediti ko je odgovoran za definisanje i sprovođenje ovih mera. Potrebno je proceniti da li postojeći okviri za upravljanje rizicima treba da budu prilagođeni rizicima specifičnim za generativnu VI i da li je potrebno dodatno upravljanje za određene slučajeve upotrebe, posebno one koji uključuju interakciju sa korisnicima. Konačno, važno je formirati poseban tim koji će nadgledati sprovođenje sveobuhvatnog plana upravljanja promenama. Ovaj plan treba da se bavi neophodnim promenama u načinu razmišljanja i ponašanja u celoj organizaciji kako bi se obezbedio uspešan prelazak na generativnu VI. U Tabeli 2 su sumirane ključne odluke koje treba doneti prilikom implementacije generativne VI.

Tabela 2 - Ključne odluke prilikom implementacije generativne VI

Oblast	Ključne oblasti odlučivanja
Strategija i vizija	Odrediti ko definiše strategiju generativne VI (na nivou cele organizacije ili poslovne jedinice). Razviti viziju potencijalne vrednosti i proceniti funkcije/procese koji će najverovatnije biti pod najvećim uticajem generativne VI.
Domeni i slučajevi upotrebe	Odlučiti ko određuje domene organizacije za primenu generativne VI i specifične slučajeve upotrebe unutar tih domena.
Model implementacije	Izabrati da li će se nabaviti ciljana rešenja, integrisati šira, sveobuhvatnija rešenja ili razviti sopstvena rešenja.
Finansiranje	Odrediti kako će se finansirati slučajevi upotrebe generativne VI, uzimajući u obzir nivo centralizacije/decentralizacije pristupa generativnoj VI.
Talenti	Definisati potrebne veštine za uspešnu primenu generativne VI i obezbediti talente putem zapošljavanja, usavršavanja, angažovanja eksternih izvršilaca ili kombinovano.

Rizik	Odrediti ko definiše mere zaštite od rizika (npr. privatnost podataka, intelektualna svojina) i strategije ublažavanja rizika. Odlučiti da li postojeći okviri zahtevaju prilagođavanja za rizike specifične za generativnu VI i da li je potreban dodatni obuhvat za određene slučajeve upotrebe (npr. one koji su okrenuti prema klijentima).
Upravljanje promenama	Formirati tim koji će voditi proces upravljanja promenama kako bi se osigurala neophodne promene u načinu razmišljanja i ponašanja za uspešno usvajanje generativne VI u celoj organizaciji.

Izvor: prilagođeno prema Buehler, K., Corsi, A., Jurisic, M., Lerner, L., Siani, A., & Weintraub, B. (2024). *Scaling gen AI in banking: Choosing the best operating model*, dostupno na: <https://www.mckinsey.com/industries/financial-services/our-insights/scaling-gen-ai-in-banking-choosing-the-best-operating-model#/> (datum pristupa 4.7.2024.)

Temeljnim analiziranjem svih navedenih odluka koje treba doneti prilikom primene VI, banke mogu da postave čvrste temelje za iskorišćavanje transformativnog potencijala generativne VI, istovremeno ublažavajući potencijalne rizike i izazove. VI je još uvek relativno nova tehnologija i postoje izazovi koji moraju biti rešeni pre nego što bankarski sektor usvoji ovu tehnologiju, kao što su potreba za više podataka i razvoj sofisticiranijih algoritama za upravljanje složenim finansijskim podacima i rizicima (Farishy, 2023).

Budućnost VI u bankarskom sektoru će verovatno biti obeležena povećanom personalizacijom, efikasnošću i inovacijama. VI će se sve više koristiti za analizu podataka o klijentima kako bi se pružili personalizovani proizvodi i usluge, pojednostavili procesi i smanjili troškovi. Iako VI može da automatizuje određene zadatke i potencijalno zameni neka radna mesta, ona će takođe stvoriti nove mogućnosti u oblastima kao što su: analiza podataka, programiranje i dalji razvoj VI (Boustani, 2022).

Mogućnosti za primenu generativne VI unutar organizacije su neograničene i kontinuirano se šire. Ova tehnologija može da transformiše svaki aspekt poslovanja, od unapređenja interakcije sa klijentima u kontakt centru do podsticanja inovacija u marketingu, razvoju proizvoda i kreiranju sadržaja. Štaviše, može da optimizuje ljudske resurse, poboljša podršku zaposlenima i redefiniše iskustva klijenata (Taulli, 2023).

Metodologija istraživanja

Metodologija istraživanja primenjena u ovom radu kombinuje kabinetsko istraživanje literature, prikaz i analizu Evident VI indeksa i studiju slučaja JPMorgan Chase. Istraživanje je sprovedeno u periodu od maja do septembra 2024. godine.

Kabinetsko istraživanje je obuhvatilo temeljno proučavanje različitih izvora, poput knjiga, akademskih radova, industrijskih izveštaja i studija slučaja vezanih za primenu VI u bankarskom sektoru. Pregled literature ima za cilj da predstavi trenutno stanje VI u bankarstvu, identifikuje ključne trendove i izazove, i analizira specifične slučajeve implementacije VI. Pored pregleda literature, rad takođe ukazuje na Evident VI indeks i njegovu strukturu, kao i sistem rangiranja koji procenjuje stepen usvajanja VI među najvećim svetskim bankama. Ovaj indeks ocenjuje banke na osnovu četiri stuba: talenta, inovacija, liderstva i transparentnosti. Analizom rezultata indeksa, rad pruža uvid u relativni napredak različitih banaka u pogledu primene VI i identifikuje lidere u ovoj oblasti. Osim toga, u radu je predstavljena i studija slučaja JPMorgan Chase, vodeće globalne banke koja aktivno integriše VI u svoje poslovanje. Studija slučaja ispituje specifične primene VI unutar JPMorgan Chase, kao što su: trgovanje uz pomoć VI, upravljanje rizicima, otkrivanje prevara, korisnička podrška i sajber bezbednost. Kroz studiju slučaja, rad pruža praktičan primer kako se VI koristi za povećanje efikasnosti, poboljšanje procesa donošenja odluka i podsticanje inovacija u bankarskom sektoru.

Kao rezultat primenjenih metoda istraživanja, ovaj rad omogućava detaljno razumevanje teme, pružajući i teorijske uvide i praktične primere implementacije VI u bankarskom sektoru.

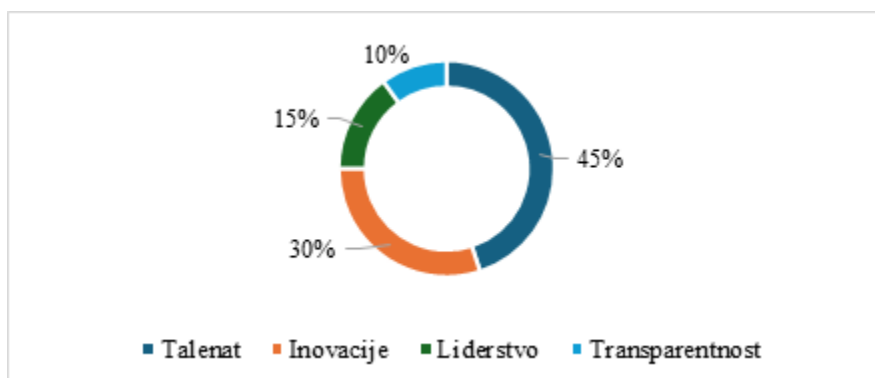
Rezultati istraživanja: Struktura Evident VI indeksa i rangiranje banaka

Evident VI indeks je sveobuhvatan sistem rangiranja osmišljen da proceni zrelost usvajanja i implementacije VI u bankarskom sektoru. On evaluira 50 najvećih svetskih banaka na osnovu preko 100 individualnih indikatora, kategorizovanih u četiri stuba (Evident Insights, 2023):

- **Talenat:** Ovaj stub procenjuje kvantitet, kvalitet i razvoj stručnjaka za VI. Uzima u obzir faktore kao što su broj zaposlenih koji se bave VI, njihovo formalno obrazovanje, kao i inicijative banke za privlačenje, zadržavanje i usavršavanje talenata u ovoj oblasti.
- **Inovacije:** Ovaj stub ocenjuje ulaganje banke u inovacije u oblasti VI, uključujući istraživački rad, prijave patenata, poduhvate, partnerstva i angažovanje u zajednici otvorenog koda. Procenjuje se sposobnost banke da razvija i primenjuje najsavremenije tehnologije VI.
- **Liderstvo:** Ovaj stub meri fokus leaderskog tima banke na VI, što se ogleda u njihovoj komunikacionoj strategiji, pozicioniranju rukovodilaca i spoljnom angažovanju u praćenju tema vezanih za VI. Procenjuje se posvećenost i vizija lidera banke u podsticanju transformacije ka VI.
- **Transparentnost:** Ovaj stub ispituje transparentnost banke u pogledu odgovorne primene VI. Razmatra faktore poput postojanja posebnih timova za odgovornu primenu VI, objavljivanja etičkih principa i komunikacije inicijativa o odgovornoj VI.

VI indeks se izračunava korišćenjem ponderisanog sistema bodovanja, gde svaki stub doprinosi određenim procentom ukupnom rezultatu. Ponderi su sledeći (Evident Insights, 2023): talenat sa 45%, inovacije sa 30%, liderstvo sa 15% i transparentnost sa 10% (Slika 1).

Slika 1 - Ponderisani sistem bodovanja u okviru Evident VI indeksa



Izvor: Prilagođeno prema Evident Insights (2023). The Evident AI Index Key Findings Report: The global standard benchmark of AI maturity. Evident Insights.

Svaka banka se evaluira na osnovu individualnih indikatora unutar svakog stuba. Ponderisani prosek rezultata u sva četiri stuba određuje ukupni rang banke prema Evident VI indeksu.

Evident VI indeks se oslanja isključivo na javno dostupne informacije, obezbeđujući nezavisnu i nepristrasnu procenu zrelosti primene VI svake banke. Služi kao vredan pokazatelj za banke, investitore i savetnike, koji im služi da prate napredak, identifikuju najbolje prakse i donose informisane odluke u vezi sa usvajanjem i transformacijom VI u bankarskom sektoru. Evident VI indeks je važan iz sledećih razloga (Evident Insights, 2023):

- Merenje uspešnosti i praćenje napretka: Indeks omogućava bankama da procene svoju zrelost u oblasti VI u poređenju sa konkurencijom i da prate svoj napredak tokom vremena. Ovo im pomaže da identifikuju oblasti u kojima su uspešni i oblasti u kojima je potrebno unapređenje.
- Identifikovanje najboljih praksi: Rangirajući banke na osnovu različitih kriterijuma, indeks ukazuje na one banke koje prednjače u primeni VI. Ovo omogućava drugim bankama da uče iz njihovih uspeha i primene najbolje prakse.
- Informisano strateško odlučivanje: Indeks pruža važne uvide u različite pristupe koje banke preduzimaju u usvajanju VI. Ove informacije mogu pomoći bankama da donesu informisanije odluke o sopstvenim strategijama i ulaganjima u VI.
- Promovisanje transparentnosti i odgovornosti: Indeks uključuje segmente koji su posvećeni transparentnosti, podstičući na taj način banke da budu otvorenije u pogledu svojih odgovornih praksi u vezi sa VI. Ovo promoviše veću odgovornost i poverenje u korišćenje VI u finansijskom sektoru.
- Podsticanje konkurencije i inovacija: Isticanjem lidera u primeni VI, indeks podstiče konkurentno okruženje koje ohrabruje banke da inoviraju i ubrzaju svoje napore u transformaciji ka VI.

U tabeli 3 je prikazano prvih deset banaka prema vrednosti Evident VI indeksa za 2023. godinu. Prema vrednostima indeksa, JPMorgan Chase je pozicioniran na prvo mesto.

Tabela 3 - Rang lista prvih deset banaka prema vrednosti Evident VI indeksa

Banka	Rang	Talenat	Inovacije	Liderstvo	Transparentnost
JPMorgan Chase	1	2	1	2	1
Capital One	2	1	2	8	5
Royal Bank of Canada	3	7	3	5	2
Wells Fargo	4	4	5	32	10
UBS	5	3	19	17	22
CommBank	6	16	20	3	4
Goldman Sachs	7	8	4	15	49
ING	8	6	10	19	15
Citigroup	9	5	8	26	31
DBS	10	22	34	1	12

Izvor: prilagođeno prema Evident Insights (2023). *The Evident AI Index Key Findings Report: The global standard benchmark of AI maturity.* Evident Insights.

Studija slučaja: JPMorgan Chase

JPMorgan Chase je globalna kompanija za finansijske usluge sa istorijom dugom više od dva veka. Pruža raznovrsne finansijske usluge, uključujući upravljanje imovinom, komercijalno bankarstvo, bankarstvo za fizička lica i investiciono bankarstvo. Ključni poslovni principi kompanije su izuzetna usluga za klijente, operativna izvrsnost, posvećenost integritetu i kultura pobedničkog duha. JPMorgan Chase nastoji da premaši očekivanja svojih klijenata pružajući im visokokvalitetne proizvode i usluge. Kompanija takođe naglašava integritet i pravičnost u svim poslovnim oblastima i odnosima. JPMorgan Chase veruje da je jaka organizaciona kultura ključna za uspeh i neguje timski rad (<https://www.jpmorganchase.com/about/business-principles>).

JPMorgan Chase prednjači u procesu integracije VI u svoje poslovne operacije, proizvode i usluge. Ova studija slučaja prikazuje strateški pristup JPMorgan Chase banke pri primeni VI, ističući ključne primere upotrebe, organizacionu strukturu i uticaj VI na performanse banke i širi finansijski sistem. JPMorgan Chase koristi VI u različitim oblastima, kao što su: upravljanje rizicima, otkrivanje prevara, trgovanje i korisnički servis. Banka je razvila sopstvenog VI virtuelnog asistenta za korporativne klijente i aktivno istražuje upotrebu generativne VI. Dominantna pozicija JPMorgan Chase banke je direktan rezultat ulaganja u talente za istraživanje VI. Banka zapošljava preko 200 istraživača VI (Business Wire, 2024). Takođe, JPMorgan Chase ima poseban tim za istraživanje VI koji sarađuje sa akademskim institucijama i partnerima iz industrije kako bi istražio najsavremenije tehnologije VI. Štaviše, JPMorgan Chase je uspostavio Centar izvrsnosti za objašnjivu VI sa ciljem podsticanja saradnje unutar organizacije i obezbeđivanja usklađenosti VI inicijativa sa poslovnim ciljevima (<https://www.jpmorgan.com/technology/artificial-intelligence/initiatives/explainable-ai-center-of-excellence>). VI se koristi za automatizaciju zadataka, unapređenje donošenja odluka i kreiranje novih proizvoda i usluga. Neki od načina na koje JPMorgan Chase koristi VI su (Erdoes, 2024):

- Identifikuje mogućnosti za implementaciju VI u celoj organizaciji.
- Automatizuje zadatke i efikasnije vodi celokupno poslovanje.
- Sarađuje sa stručnjacima ili pojedincima koji imaju znanje i razumevanje VI kako bi pomogli rukovodiocima da identifikuju sve mogućnosti.

U tabeli 4 su prikazane ključne primene VI u JPMorgan Chase banci.

Tabela 4 - Primena VI u JPMorgan Chase banci

Primena VI	Opis	Uticaj
Trgovanje i upravljanje rizicima		
Algoritamsko trgovanje	Algoritmi VI izvršavaju brze trgovine i prate performanse portfolija.	Poboljšava izvršenje trgovine i upravljanje rizicima.
Procena rizika	Modeli mašinskog učenja analiziraju ogromne količine podataka kako bi procenili kreditne rizike, volatilnost tržišta i potencijalne prilike.	Poboljšava sposobnost banke da efikasno upravlja rizicima.
Otkrivanje prevara	Sistemi VI kontinuirano prate transakcije kako bi identifikovali sumnjivu aktivnost u realnom vremenu.	Smanjuje finansijske gubitke usled prevara i jača bezbednost.

Inicijative usmerene na klijente		
Četbotovi i virtuelni asistenti	VI četbotovi i virtuelni asistenti pružaju trenutnu podršku klijentima i odgovaraju na upite.	Povećava efikasnost i dostupnost korisničkog servisa.
Personalizovane preporuke	Algoritmi VI analiziraju istoriju transakcija i ponašanje klijenata kako bi ponudili personalizovane predloge proizvoda.	Povećava mogućnosti unakrsne prodaje identifikovanjem relevantnih proizvoda za klijente.
Kreditno bodovanje	Modeli VI procenjuju kreditnu sposobnost preciznije od tradicionalnih metoda.	Omogućava banci da proširi kredite i zajmove na širi spektar klijenata uz poboljšanu procenu rizika.
Operativna izvrsnost		
Analitika podataka	Mašinsko učenje i analitika velikih podataka pomažu banci da izvuče korisne uvide iz ogromnih skupova podataka.	Informiše strateško donošenje odluka i poboljšava upravljanje rizicima.
Automatizacija	Robotska automatizacija procesa automatizuje repetitivne zadatke.	Smanjuje operativne troškove, minimizira greške i oslobađa zaposlene za složenije zadatke.
Sprečavanje pranja novca	Algoritmi VI unapređuju procese koji se odnose na sprečavanje pranja novca identifikovanjem sumnjivih transakcija i smanjenjem lažno pozitivnih rezultata.	Povećava efikasnost i tačnost praćenja sumnjivih transakcija.
VI i sajber bezbednost		
Otkrivanje pretnji	Sistemi VI za sajber bezbednost identifikuju i neutrališu sajber pretnje analizirajući obrasce i anomalije u mrežnom saobraćaju.	Jača bezbednosnu poziciju banke i smanjuje rizik od sajber napada.
VI i održivo finansiranje		
Analitika vezana za održivost finansiranja	Alati VI analiziraju podatke o životnoj sredini, društvenoj odgovornosti i upravljanju (engl. environmental, society, governance - ESG) kako bi procenili rizike i prilike za ulaganja povezane sa održivošću.	Podržava posvećenost banke odgovorom ulaganju.

Izvor: prilagođeno prema Verma, N. (2023). JP Morgan Chase: Revolutionizing Banking Through AI – Case Study, dostupno na: <https://medium.com/@vermanikhil605/jp-morgan-chase-revolutionizing-banking-through-ai-case-study-a659c0b0957f> (datum pristupa 1.7.2024)

Ciljevi istraživanja VI koje sprovodi JPMorgan Chase jesu da se VI iskoristi za razumevanje i upravljanje složenim ekonomskim sistemima, predviđanje i sprečavanje finansijskog kriminala, omogućavanje bezbedne razmene podataka, poboljšanje iskustva klijenata, osnaživanje zaposlenih i obezbeđivanje usklađenosti sa propisima. Sveobuhvatni cilj je da se razvije i primeni etička VI koja koristi ne samo kompaniji već i njenim klijentima, zaposlenima i društvu u celini (<https://www.jpmorgan.com/technology/artificial-intelligence>).

Trenutno stanje primene veštačke inteligencije u bankama u Srbiji

VI ima potencijal da pruži značajne i vredne koristi za centralne banke (Martin, 2024). Narodna banka Srbije (NBS) koristi širok spektar tehnika VI u različite svrhe, kao što su (Tabaković, 2023):

- **Upravljanje rizicima i otkrivanje prevara:** NBS primenjuje prediktivnu analitiku i algoritme mašinskog učenja, konkretno samoorganizujuće mape (engl. Self-Organizing Maps) i Lasso logističku regresiju, u svom sistemu ranog upozoravanja za predviđanje potencijalnih teškoća u bankarskim operacijama. Na ovaj način je omogućeno proaktivno praćenje i ublažavanje rizika.
- **Makroekonomska analiza:** Modeli mašinskog učenja se koriste za procenu makroekonomskog okruženja, pomažući u scenarijima testiranja otpornosti bankarskog sektora. Takođe, služe kao podrška u projektovanju referentnog vodiča za stopu kontraciklične rezerve kapitala, doprinoseći finansijskoj stabilnosti.
- **Praćenje inflacije u realnom vremenu:** NBS je razvila inovativni model za trenutnu procenu inflacije zasnovan na veb skrejpung tehnologiji. Ovaj model automatski prikuplja podatke o cenama sa preko 130 veb sajtova, pokrivajući oko 90% korpe potrošačkih cena. Prikupljeni podaci se zatim obrađuju pomoću automatizovanih algoritama kako bi se pružili uvidi u realnom vremenu o trendovima inflacije. Ovo omogućava NBS da prati inflaciju na dnevnom ili nedeljnom nivou, omogućavajući pravovremene intervencije.

NBS je uspešno integrisala VI u svoje poslovanje, demonstrirajući sveobuhvatan pristup korišćenja VI za različite potrebe i svrhe. Upotreba VI u upravljanju rizicima, otkrivanju prevara, makroekonomskoj analizi i praćenju inflacije u realnom vremenu pokazuje posvećenost banke inovacijama i donošenju odluka zasnovanih na podacima.

Na osnovu podataka od 1. jula 2024. godine u bankarskom sektoru Srbije postoji 20 poslovnih banaka, od čega su dve državne banke, tri domaće privatne banke i 15 stranih banaka (<https://www.nbs.rs/sr/finansijske-institucije/banke/spisak-banaka/>). Odlukom o utvrđivanju liste sistemski značajnih banaka u Srbiji od 10. maja 2024. godine utvrđeno je da postoji devet banaka koje u Srbiji predstavljaju sistemski značajne banke (https://nbs.rs/sr_RS/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/sistemski-znacajne-banke/). Prema istraživanju koje je sprovedla NBS 2023. godine, utvrđeno je da banke u Srbiji koriste VI na različite načine. Sedam banaka koristi prediktivnu analitiku, šest koristi robotsku automatizaciju procesa, četiri koriste mašinsko učenje, a tri koriste analitiku u realnom vremenu (Tabela 5).

Tabela 5 - Primena VI u bankama u Srbiji

Primena VI	Broj banaka	Procenat u odnosu na ukupan broj banaka
Prediktivna analitika	7	35%
Robotska automatizacija procesa	6	30%
Mašinsko učenje	4	20%
Analitika u realnom vremenu	3	15%
Ne primenjuju, ali planiraju da primene u budućnosti	5	25%

Izvor: prilagođeno prema Tabaković, J. (2023). Governor Tabaković's speech at Finticipate vol. 2 – SEE Fintech Forum, dostupno na: <https://nbs.rs/en/scripts/showcontent/index.html?id=18981> (datum pristupa 1.7.2024)

U svom izveštaju NBS nije navela nazive, niti je izložila vlasničku strukturu banaka koje primenjuju VI u svom poslovanju. Stoga su u ovom radu isključivo prikazani javno dostupni podaci do kojih se moglo doći pretraživanjem Internet sajtova banaka i drugih javnih izvora, a koji se odnose na primenu VI u bankama. Raspoloživi podaci o primeni VI u bankama u Srbiji ukazuju da tu spadaju četiri sistemski značajne banke - Raiffeisen, Intesa Sanpaolo, UniCredit i OTP banka i jedna banka koja nije svrstana u sistemski značajne banke - 3Banka. Posledično, može se zaključiti da procenat sistemski značajnih banaka u Srbiji koje primenjuju VI u svom poslovanju iznosi 44,44%.

Raiffeisen banka je bila predvodnik primene VI u Srbiji uvođenjem usluge zasnovane na VI u vidu virtuelnog asistenta, četбота po imenu Rea (engl. Raiffeisen Electronic Assistant). Rea pruža korisničku podršku non-stop na različitim platformama poput Viber-a, Facebook-a i veb sajta banke. Rea prvenstveno odgovara na pitanja o ponudi banke, ali i edukuje korisnike o drugim digitalnim uslugama. Inicijalno je konstruisana za predstavljanje proizvoda banke, ali je vremenom Rea evoluirala kako bi pomogla registrovanim korisnicima u različitim zadacima, kao što su: provera stanja na računu, obavljanje plaćanja, slanje novca putem QR koda i plaćanje računa (Dukić, 2023). Preuzimajući jednostavne i uobičajene upite, Rea omogućava zaposlenima banke da se fokusiraju na klijente sa složenijim potrebama. Rea funkcioniše u potpunosti u skladu sa standardima elektronskog bankarstva i bezbednosnim i kulturnim normama svog okruženja. Posvećenost bezbednosti i etičkoj upotrebi VI predstavlja način na koji Raiffeisen banka pristupa ovoj tehnologiji (Buha & Bjegović, 2023). Pored opisanog, Raiffeisen banka koristi VI i u drugim oblastima svog poslovanja. Na primer, sistem za upravljanje odnosima sa klijentima pod nazivom Selecta (sistem kompanije Saga (<https://selectacrm.app/?lang=sr>)) koristi pristup 360°, izgrađujući sveobuhvatne korisničke profile na osnovu interakcija na različitim kanalima, uključujući mobilno bankarstvo, imejl, četbotove, bankomate, kontakt centre i ekspoziture. Ovaj integrisani pristup omogućava Raiffeisen banci da pruži personalizovano i efikasnije korisničko iskustvo (Buha & Bjegović, 2023).

Banka Intesa Sanpaolo ima posebnu laboratoriju za VI u okviru koje se razvijaju praktična rešenja i sprovode teorijska istraživanja kako bi se pripremila za specifične izazove poslovnog i finansijskog sektora. Koristeći sveobuhvatnu bazu znanja, primarni cilj banke je zaštita finansijskih portfolija od značajnih tržišnih fluktuacija. Iskorišćavanjem potencijala VI, tim stručnjaka može da analizira velike skupove faktora rizika za samo nekoliko sekundi, drastično smanjujući vreme koje se nekada merilo nedeljama (Banka Intesa, 2021). Pored toga, Intesa Sanpaolo primenjuje sisteme VI za automatizaciju poslovnih procesa, pripremu personalizovanih ponuda klijentima, preciznije targetiranje klijenata i sprečavanje zloupotreba (Urošević, 2023).

VI se još uvek dominantno primenjuje u aktivnostima koje se odnose na informisanje klijenata i komunikaciju sa njima. Na primer, UniCredit i OTP banka koriste virtuelne asistente, odnosno četbotove, koji pružaju odgovore na različita pitanja klijenata o proizvodima i uslugama. OTP banka, pored OTI četbota, već nekoliko godina primenjuje VI u upravljanju odnosima sa klijentima, kao i u odeljenju za rizike. Od banaka koje nisu klasifikovane kao sistemski značajne banke, a primenjuju VI značajno je istaći 3Banku (poznatija kao Opportunity banka do 2021. godine). Ova banka je još 2015. godine primenjivala tehničko rešenje koje je na osnovu podataka prikupljenih sa terena automatski donosilo odluke o odobrenju kredita (Marković, 2023).

Zaključak

VI, a posebno generativna VI, revolucionarno menja bankarski sektor. VI se koristi za povećanje efikasnosti, poboljšanje korisničkog iskustva i automatizaciju različitih procesa unutar banaka. Vodeće finansijske institucije poput JPMorgan Chase uspešno su integrisale VI u svoje poslovanje, koristeći je za zadatke kao što su: trgovanje, upravljanje rizicima, otkrivanje prevara, korisnički servis i sajber bezbednost. Od 20 banaka koje posluju u Srbiji (na dan 1. jul 2024. godine), sedam banaka koristi prediktivnu analitiku, šest banaka robotsku automatizaciju procesa, četiri banke mašinsko učenje i tri banke analitiku u realnom vremenu. Dostupni podaci ukazuju da u Srbiji četiri od ukupno devet sistemski značajnih banaka primenjuju VI u svom poslovanju. Takođe, značajno je istaći i da Narodna banka Srbije, kao centralna banka, primenjuje VI za upravljanje rizicima, otkrivanje prevara, makroekonomsku analizu i praćenje inflacije u realnom vremenu.

Ovaj rad pruža nekoliko teorijskih i praktičnih implikacija za razumevanje i primenu VI u bankarskom sektoru. Sa teorijskog stanovišta, rad se bavi novom oblašću generativne VI, ističući njen potencijal da transformiše različite aspekte bankarstva. To doprinosi rastućem korpusu znanja o ulozi VI u bankarskom sektoru. Rad pruža pregled tehnologija VI i njihovih mogućnosti primene u bankarstvu, obogaćujući teorijsko razumevanje ove oblasti. Studija slučaja JPMorgan Chase banke nudi uvid u to kako vodeća banka koristi VI za unapređenje svojih operacija i performansi. Ova analiza doprinosi teorijskom razumevanju odnosa između primene VI i profitabilnosti banke.

Sa praktičnog stanovišta, rad pruža značajne praktične smernice za banke koje razmatraju primenu VI. Rad ističe ključne odluke koje treba doneti prilikom implementacije generativnog operativnog modela VI, pomažući na taj način bankama da se lakše snađu u složenom procesu integracije VI. Evident VI indeks, koji je detaljno predstavljen u radu, služi kao vredan alat za banke da procene svoju zrelost u oblasti VI u poređenju sa liderima u ovom sektoru i identifikuju najbolje prakse. Samim tim, banke imaju jasne smernice u pogledu razvoja efektivnih strategija VI i maksimiziranju koristi od primene VI.

Rad ima određena ograničenja. Prvenstveno, orijentisan je samo na pozitivne aspekte VI u bankarstvu, ističući njene potencijalne koristi. Međutim, nedostaje kritička analiza potencijalnih rizika i izazova povezanih sa primenom VI, kao što su gubitak radnih mesta i pretnje sajber bezbednosti. Iako su u radu primenjeni različiti izvori, treba napomenuti da se rad isključivo oslanja na sekundarne podatke koji mogu biti podložni pristrasnosti i subjektivnosti.

Predlog za buduća istraživanja je da se sprovede detaljnija analiza i diskusija o pozitivnim i negativnim aspektima primene VI u bankarskom sektoru. Kako bi se stekao dublji uvid u ovu problematiku, neophodno je sprovediti istraživanje zasnovano na prikupljanju primarnih podataka. Konkretnije, sprovođenje istraživanja putem upitnika ili intervju sa zaposlenima u bankama, klijentima banaka, kao i sa stručnjacima iz oblasti VI i finansija. Ovakav pristup bi omogućio prikupljanje kvalitativnih i kvantitativnih podataka koji bi pružili širu sliku o uticaju VI na bankarski sektor, kao i o percepciji i iskustvima različitih aktera u ovom procesu.

Literatura

1. Al-Hawamdeh, S., & Alshaer, M. M. (2022). Artificial Intelligence Applications as a Modern Trend to Achieve Organizational Innovation in Jordanian Commercial Banks. *Journal of Asian Finance Economics and Business*, 9(3), 257-263. <https://doi.org/10.13106/jafeb.2022.vol9.no3.0257>
2. Banka Intesa (2021). Veštačka inteligencija je tu da ostane, dostupno na: <https://www.bancaintesa.rs/stanovnistvo/nas-svet/upoznajte-nas-svet/vestacka-inteligencija-trajno-resenje.html> (datum pristupa 1.7.2024)
3. Boustani, N. M. (2022). Artificial intelligence impact on banks clients and employees in an Asian developing country. *Journal of Asia Business Studies*, 16(2), 267-278. <https://doi.org/10.1108/JABS-09-2020-0376>
4. Buehler, K., Corsi, A., Jurisic, M., Lerner, L., Siani, A., & Weintraub, B. (2024). Scaling gen AI in banking: Choosing the best operating model, dostupno na: <https://www.mckinsey.com/industries/financial-services/our-insights/scaling-gen-ai-in-banking-choosing-the-best-operating-model#/> (datum pristupa 4.7.2024)
5. Buha, V., & Bjegović, M. (2023). Application of artificial intelligence in the banking sector. *Bezbednost*, 65(1), 87-106. DOI: 10.5937/bezbednost2301087B
6. Burgess, A. (2017). *The executive guide to artificial intelligence: How to find and implement applications for AI in your organization*. Springer, Cham, Switzerland.
7. Business Wire (2024). JPMorgan Chase Dominates AI Research In Banking As Future Challengers Emerge, dostupno na: <https://aijourn.com/jpmorgan-chase-dominates-ai-research-in-banking-as-future-challengers-emerge/> (datum pristupa 4.7.2024)
8. Dukić, M. (2023). Kako veštačka inteligencija može da se upotrebi u bankarstvu?, dostupno na: <https://www.kamatica.com/analiza/kako-vestacka-inteligencija-moze-da-se-upotrebi-u-ban-karstvu/70096> (datum pristupa 7.7.2024)
9. Erdoes, M. (2024). Leading with AI, dostupno na: <https://www.jpmorgan.com/technology/news/leading-with-AI> (pristupljeno 6.7.2024)
10. Evident Insights (2023). *The Evident AI Index Key Findings Report: The global standard benchmark of AI maturity*. Evident Insights.
11. Farishy, R. (2023). The Use of Artificial Intelligence in Banking Industry. *International Journal of Social Service and Research*, 3(7), 1724-1731.
12. Funcas (2021). *The Future of Banking Jobs. A Sector in Transformation*. Funcas.
13. Ghandour, A. (2021). Opportunities and challenges of artificial intelligence in banking: Systematic literature review. *TEM Journal*, 10(4), 1581-1587. <https://doi.org/10.18421/TEM104-12>
14. Kaya, O. (2019). Artificial intelligence in banking: A lever for profitability with limited implementation to date (EU Monitor). Deutsche Bank Research.
15. Marković, K. (2023). Veštačka inteligencija među bankarima, dostupno na: <https://bonitet.com/vestacka-inteligencija-medju-bankarima/> (datum pristupa 9. 9. 2024).
16. Martin, V. (2024). Integrating artificial intelligence into central banking: Opportunities, challenges, and implications. *Journal of Process Management and New Technologies*, 12(1-2), 49-60.
17. McMullen, M. (2023). AI in Finance - 5 Benefits for Better Banking. Towards AWS, dostupno na: <https://towardsaws.com/ai-in-finance-5-benefits-for-better-banking-70cbaae31911> (datum pristupa 5.7.2024)
18. Nicoletti, B. (2021). *Banking 5.0. How Fintech will Change Traditional Banks in the "New Normal" Post Pandemic*. Palgrave Studies in Financial Service Technology. Switzerland: Palgrave MacMillan.

19. Nowakowski, M. (2024). Ethical FinTech: The Importance of Ethics in Creating Secure Financial Products and Services. In: Lasak, P., & Williams, J. (Eds.), Digital Transformation and the Economics of Banking. Economic, Institutional and Social Dimensions (pp. 81-98). London and New York: Routledge, Taylor & Francis Group.
20. Omarini, A. (2024). From Digital Technologies to New Economics in Banking: How to Drive the Future of Digital Money and Data Information Knowledge. In: Lasak, P., & Williams, J. (Eds.), Digital Transformation and the Economics of Banking. Economic, Institutional and Social Dimensions (pp. 31-49). London and New York: Routledge, Taylor & Francis Group.
21. Šehović, D. (2017). Sajber otpornost finansijskih institucija. Bankarstvo, 46(4), 134-151. <https://doi.org/10.5937/bankarstvo1704134S>
22. Skilton, M., & Hovsepian, F. (2017). The 4th industrial revolution: Responding to the impact of artificial intelligence on bussiness. Springer. Cham, Switzerland.
23. Stojmenović, M. (2020). Društveno-ekonomski aspekti povlačenja gotovine iz upotrebe. Bankarstvo, 49(3), 102-127. <https://doi.org/10.5937/bankarstvo2003102S>
24. Tabaković, J. (2023). Governor Tabaković's speech at Finticipate vol. 2 – SEE Fintech Forum, dostupno na: <https://nbs.rs/en/scripts/showcontent/index.html?id=18981> (datum pristupa 1.7.2024)
25. Taulli, T. (2023). Generative AI: How ChatGPT and Other AI Tools Will Revolutionize Business. Apress. <https://doi.org/10.1007/978-1-4842-9367-6>
26. Urošević, B. (2023). Od sprečavanja zločina do procene rizika – kako srpske banke koriste AI, dostupno na: <https://rs.bloombergdria.com/a-c/tehnologija/digitalizacija/58637/ai-malim-bankama-moze-da-pomogne-da-stignu-velike> (datum pristupa 9.9.2024)
27. Verma, N. (2023). JP Morgan Chase: Revolutionizing Banking Through AI – Case Study, dostupno na: <https://medium.com/@vermanikhil605/jp-morgan-chase-revolutionizing-banking-through-ai-case-study-a659c0b0957f> (datum pristupa 1.7.2024)
28. Waliszewski, K. (2024). Banking-as-a-Service and Embedded Banking as Innovative Methods of Providing Banking Services. In: Lasak, P., & Williams, J. (Eds.), Digital Transformation and the Economics of Banking. Economic, Institutional and Social Dimensions (pp. 50-66). London and New York: Routledge, Taylor & Francis Group.
29. <https://www.jpmorganchase.com/about/business-principles> (datum pristupa 1.7.2024)
30. <https://www.jpmorgan.com/technology/artificial-intelligence> (datum pristupa 1.7.2024)
31. <https://www.jpmorgan.com/technology/artificial-intelligence/initiatives/explainable-ai-center-of-excellence> (datum pristupa 1.7.2024)
32. <https://selectacrm.app/?lang=sr> (datum pristupa 10.7.2024)
33. <https://www.nbs.rs/sr/finansijske-institucije/banke/spisak-banaka/> (datum pristupa 9.9.2024)
34. https://nbs.rs/sr_RS/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/sistemi-ki-znacajne-banke/ (datum pristupa 9.9.2024)

Received: 01.08.2024.
Accepted: 16.09.2024.

DOI: 10.5937/bankarstvo2403054L

MANAGING THE ARTIFICIAL INTELLIGENCE DRIVEN BANKING TRANSFORMATION: A CASE STUDY OF JPMORGAN CHASE

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Abstract: The emergence of neo-banks, BigTech, and FinTech competitors is rapidly transforming the banking sector, forcing traditional banks to adopt advanced technologies like artificial intelligence to remain competitive. This paper examines the application of artificial intelligence in the banking sector, with a specific focus on generative artificial intelligence. It explores the various ways artificial intelligence is being used to enhance efficiency, improve customer service, and automate processes within banks. The paper presents a case study of JPMorgan Chase, a leading global financial institution that has successfully integrated artificial intelligence into its operations. Additionally, it provides an overview of the current state of artificial intelligence adoption in banks in Serbia, highlighting the progress made by the National Bank of Serbia and other commercial banks in utilizing artificial intelligence. The paper concludes by emphasizing the transformative potential of artificial intelligence in the banking sector and its role in shaping the future of financial services.

Keywords: artificial intelligence, banking sector, digital transformation, technological innovation, JPMorgan Chase, Serbian banks

JEL classification: O33, L86, G21

Introduction

Banks have continuously adapted to society's digital transformation, introducing numerous innovative products and services (Šehović, 2017; Stojmenović, 2020). These include ATMs, credit and debit cards, various online payment and investment services, electronic fund transfers, telephone and mobile banking, mobile applications, digital wallets, and internet banking (Funcas, 2021). While technology has been integral to the banking sector since the mid-20th century, the financial landscape is undergoing a profound shift due to the emergence of innovative competitors, business models, products, and services. Although banks have historically been adept at integrating technology, the current financial services ecosystem demands a deeper transformation (Omarini, 2024). There are many new technologies used in finance such as artificial intelligence, advanced data analytics, big data, distributed ledger technology, blockchain, biometrics, remote user identification, cloud computing, Web3, and metaverse (Nowakowski, 2024). Furthermore, new types of banks, so-called neo-banks are emerging, as digital-only banks that operate entirely online or through mobile applications, without physical branches. They emerged due to the increasing digitalization of financial services and cater to tech-savvy customers who prefer online banking. Neo-banks often offer features like user-friendly interfaces, quick account opening, and lower fees compared to traditional banks. They aim to provide a more convenient and accessible banking experience, particularly for millennials and younger generations (Funcas, 2021). To remain competitive with emerging neo-banks and rivals like FinTech and BigTech companies, traditional banks must embrace and integrate modern technological solutions into their operations (Waliszewski, 2024). One of those solutions is artificial intelligence (AI). AI refers to the ability of computer programs to acquire and apply knowledge without human intervention. AI systems observe the world around them, analyze information autonomously, draw conclusions, and take appropriate actions. They learn from their previous judgments and improve their performances over time (Kaya, 2019). AI encompasses a range of technologies that enable machines to simulate human intelligence, such as learning, reasoning, problem-solving, perception, and language understanding (Ghandour, 2021). In the context of banking, AI refers to the use of computers and machines to simulate human intelligence, particularly in analyzing events and making decisions. AI systems can perform tasks that typically require human intelligence, such as recognizing patterns, learning from data, making decisions and predictions (Boustani, 2022).

The subject of this paper is the application of AI and generative AI in the banking sector. The paper's purpose is to thoroughly study and highlight all of the options for adopting AI in banks, using specific examples of banks that have already used AI systems in their business operations.

The key research questions (RQ) are:

RQ 1: How is AI applied in the banking sector?

RQ 2: What are the key decisions that need to be made when implementing generative AI in a bank?

RQ 3: Which bank is the most advanced in AI and what are the key applications of AI?

RQ 4: What is the level of AI adoption among Serbian banks?

This paper makes an important contribution to the general understanding of the role of AI in banking by providing a comprehensive overview of emerging technologies and practical examples of their use in top banks such as JPMorgan Chase. From a practical standpoint, the paper's value is that

it provides new instructions for implementing the generative AI model, highlighting the Evident AI index as a significant and valuable instrument for assessing banks' maturity in the usage of AI in their operations. As a result, the significance of this paper stems from its overview and synthesis of existing methodologies that banks use in order to design effective strategies and maximize the benefits of AI, consequently defining new standards in the banking sector.

This paper is structured as follows: It begins by outlining the research aims and key research questions, followed by a thorough literature review regarding the fundamentals of AI and generative AI, its diverse applications within the banking sector, and key definitions. The second part of the paper is devoted to research methodology and results. The Evident AI index was pointed out with an explanation of its structure and a ranking of the ten leading banks in the application of AI, followed by a case study of JPMorgan Chase as the best ranked financial institution in terms of the application of AI. The paper then highlights the current state of AI development and implementation in the Serbian banking sector. The paper concludes by summarizing key findings and offering theoretical and practical implications. It acknowledges limitations and proposes avenues for future research, contributing to the ongoing discourse on AI's transformative role in banking.

Literature Review: Artificial Intelligence in the Banking Sector

AI can be defined as the scientific exploration of the computational principles behind thought and intelligent behavior (Skilton & Hovsepian, 2017). It represents the ability of computer systems to tackle complex problems, mimic human-like responses, and exhibit intelligent behavior (Burgess, 2017). In essence, AI is a collection of diverse technologies that has numerous advantages such as: automating processes, improving decision-making, enhancing customer experiences, and mitigating risks (Boustani, 2022). AI is not a single technology, but a combination of different technologies applied to various use cases. There are several AI technologies that are applied in banking (Ghandour, 2021):

- Natural Language Processing (NLP) and machine learning systems are employed to automate customer service interactions, analyze spending patterns, and execute financial transactions on behalf of customers.
- Big data analytics systems, powered by AI and machine learning, are utilized to deliver personalized customer services and experiences. These systems leverage vast amounts of customer data to gain insights into their needs and behaviors, enabling banks to tailor products and services accordingly.
- AI-powered big data analytics also aids executives and managers in making informed decisions regarding internal processes, operations, investments, risks, and resource allocation.
- Machine learning and predictive analytics are employed to detect fraudulent transactions, ensure compliance with internal policies and regulations, enhance transaction security, and forecast future trends.

The authors who examined the use of AI in Jordanian commercial banks have identified three AI applications in banks (Al-Hawamdeh & Alshaer, 2022):

- Expert systems: These systems store human knowledge in computers to solve problems that typically require human expertise. They simulate expert thought processes but cannot learn from experience. Expert systems are used in banking for tasks such as credit scoring, fraud detection, and customer service.

- **Neural network systems:** These systems are modeled after the neural networks in the human brain. They can learn from experience and recognize patterns, making them useful for tasks such as image recognition, natural language processing, and risk assessment.
- **Fuzzy logic systems:** These systems can process multiple values for the same variable, allowing them to solve problems with a range of data. They are used in banking for tasks such as loan approval, portfolio management, and financial forecasting.

In Table 1 is presented classification of AI components in banks by Nicoletti (2021).

Table 1 - Classification of AI Components in Banks

AI components	Types
Probabilistic reasoning (Machine learning)	Neural networks, Predictive analytics
Computational logic	Rule-based reasoning, Expert systems, Constraint-based reasoning, Automated reasoning
Smart interfaces	Natural language, Chatbots, Computer vision
Smart process automation	Cognitive technologies, Robotic process automation, Robotics motion and manipulation

Source: Adapted from Nicoletti, B. (2021). *Banking 5.0. How Fintech will Change Traditional Banks in the "New Normal" Post Pandemic*. Palgrave Studies in Financial Service Technology. Switzerland: Palgrave MacMillan.

By reviewing the literature, AI in the banking sector can be applied for (Kaya, 2019; Nicoletti, 2021; Boustani, 2022; McMullen, 2023):

- **Fraud detection and prevention:** AI algorithms analyze massive volumes of transaction data in real time. By learning from historical patterns and identifying anomalies, AI can quickly flag suspicious activities, such as unusual spending amounts or locations, that may indicate fraudulent behavior. This enables banks to take immediate action, such as blocking transactions or alerting customers, to prevent financial losses.
- **Debt collection and recovery:** AI offers valuable solutions for debt collection and recovery, particularly during economic downturns when customer defaults increase. By employing AI-powered early warning systems and predictive analytics, businesses can significantly enhance their debt collection efforts and mitigate financial risk.
- **Streamlined underwriting process:** Leveraging machine learning models and robotic process automation can significantly streamline the underwriting process, particularly in online loan approvals. This synergy can drastically reduce the time typically required for loan decisions.
- **Know Your Customer (KYC) processes:** KYC is a critical regulatory requirement for banks to verify the identities of their customers and assess potential risks. AI-powered systems can automate and streamline this process by extracting and verifying information from various documents, such as passports, driver's licenses, and utility bills. AI algorithms can also cross-reference customer data with external sources, such as sanctions lists and watchlists, to identify any potential red flags.

- **Chatbots and virtual assistants:** AI-powered chatbots and virtual assistants are transforming customer service in banking. These intelligent agents can handle a wide range of customer inquiries, from basic account balance checks to more complex financial advice. By leveraging natural language processing (NLP) and machine learning, chatbots can understand and respond to customer queries in a conversational manner, providing quick and efficient support 24/7. The key benefits of chatbots include improved customer service, a personalized customer journey, reduced waiting times, and cost savings. Additionally, they allow bank employees to focus on more complex and creative tasks, potentially leading to improved job satisfaction (Nicoletti, 2021).
- **Improved customer experience:** AI enables banks to personalize their services to customer needs and behaviors. AI-powered chatbots and applications can provide personalized financial advice, bill payment reminders, and easier access to account information, enhancing the overall customer experience.
- **Robo-advisors and personalized financial planning:** Robo-advisors are AI-driven platforms that offer automated investment advice and portfolio management services. By analyzing customer data, such as risk tolerance, financial goals, and investment preferences, robo-advisors can create personalized investment portfolios and provide recommendations tailored to individual needs. This democratizes access to financial advice, making it more affordable and accessible to a wider range of customers.
- **Data analysis and extraction:** Banks deal with vast amounts of unstructured data, such as legal documents, contracts, and financial reports. AI-powered tools can analyze and extract valuable insights from this data, automating tasks that would otherwise require significant manual effort. For example, AI algorithms can identify and extract key clauses from legal documents, summarize financial reports, and even predict market trends based on news and social media sentiment.
- **Increased efficiency and productivity:** AI can automate routine tasks, freeing employees to focus on more complex activities that require creativity. This increases efficiency within the bank and its overall productivity.
- **Innovation and competitive advantage:** Banks that adopt AI can develop innovative products and services, differentiating themselves from competitors and maintaining a leading position in the ever-evolving market.
- **Democratization of financial services:** AI is making financial services more accessible by simplifying processes and reducing costs. For instance, robo-advisors are prepared to democratize portfolio investment by making it affordable for customer groups who were previously excluded due to high fees.

These applications demonstrate the transformative potential of AI in the banking sector. By automating processes, improving decision-making, and enhancing customer experiences, AI is revolutionizing how banks operate and deliver financial services. Furthermore, AI has the potential to significantly impact bank profitability. AI technologies can reduce costs, particularly in areas like labor and operations, and contribute to revenue generation by enabling the development of new, tailored products and services that better meet customer needs. Empirical analysis suggests a positive correlation between AI adoption and bank profitability, indicating that banks actively investing in AI technologies tend to be more profitable. This highlights the importance of AI implementation for banks to address challenges like weak profitability and remain competitive in an increasingly digital and data-driven financial landscape (Kaya, 2019).

Generative AI and Key Decisions for its Implementation in the Banking Sector

Generative AI encompasses a category of artificial intelligence systems capable of producing innovative and unique content. These systems are exposed to extensive datasets during their training phase, enabling them to identify and understand the patterns and structures inherent in the data. Upon completion of training, these systems can generate new content that, while never encountered before, bears a resemblance to the examples they were trained on (Taulli, 2023).

Introducing generative AI into an organization requires careful consideration across various key areas described in this paper (Buehler et al., 2024). First, it should be defined who will lead the development of the generative AI strategy, whether it is a centralized effort or delegated to individual business units. Establishing a vision for the potential value that generative AI can bring and identifying the functions and processes likely to be most impacted will guide the implementation process. Second, it is important to determine who has the authority to decide which enterprise domains will utilize generative AI and what specific use cases within those domains will be prioritized. This ensures alignment between the technology's capabilities and the organization's objectives. Third, it is important to choose the most suitable approach for implementing generative AI. This could involve procuring targeted solutions ("taker"), integrating broader solutions ("shaper"), or developing in-house solutions ("maker"). Each model has its own advantages and implications for resources, control, and customization. Fourth, it is important to make decisions on the funding mechanism for generative AI initiatives and to consider whether funding will be centralized or decentralized, aligning with the overall approach to generative AI adoption within the organization. Fifth, human resources should be planned with identification of the necessary skills required for successful generative AI implementation. This could involve hiring new talent, upskilling existing employees, or outsourcing specific tasks. Sixth, it is important to establish clear risk guardrails, such as data privacy and intellectual property protection, and determine who is responsible for defining and enforcing these safeguards. Assess whether existing risk management frameworks need to be adjusted for generative AI-specific risks and whether additional governance is necessary for certain use cases, especially those involving customer interaction. Finally, it is important to create a dedicated committee to oversee the execution of a comprehensive change management plan. This plan should address the necessary shifts in mindsets and behaviors across the organization to ensure a successful transition towards widespread generative AI adoption. Table 2 summarizes key decision areas for implementing a generative AI operating model.

Table 2 - Key Decision Areas for Implementing a Generative AI Operating Model

Area	Key Decision Areas
Strategy and vision	Determine who defines the generative AI strategy (enterprise-wide or business unit level). Develop a vision for potential value and assess functions/processes most likely to be affected by generative AI.
Domains and use cases	Decide who determines the enterprise domains of generative AI use cases and the specific use cases within those domains.
Deployment model	Choose whether to be a "taker" (procure targeted solutions), a "shaper" (integrate broader solutions), or a "maker" (develop in-house solutions).
Funding	Determine how generative AI use cases will be funded, considering the level of centralization/decentralization of the generative AI approach.
Talent	Define the necessary skills for generative AI initiatives and acquire talent through hiring, upskilling, outsourcing, or a combination.

Risk	Determine who defines risk guardrails (e.g., data privacy, intellectual property) and mitigation strategies. Decide whether existing frameworks need adjustments for generative AI-specific risks and whether additional governance is required for certain use cases (e.g. customer-facing ones).
Change management	Establish a committee to lead the execution of a change management plan to ensure necessary shifts in mindsets and behaviors for successful generative AI adoption across the enterprise.

Source: adapted from Buehler, K., Corsi, A., Jurisic, M., Lerner, L., Siani, A., & Weintraub, B. (2024). *Scaling gen AI in banking: Choosing the best operating model*, available on: <https://www.mckinsey.com/industries/financial-services/our-insights/scaling-gen-ai-in-banking-choosing-the-best-operating-model#/> (Accessed 4 July 2024)

By thoroughly addressing these key decision points, banks can lay a strong foundation for harnessing the transformative potential of generative AI while mitigating potential risks and challenges. AI is still a relatively new technology, and there are challenges that need to be addressed before it can be fully adopted by the banking sector such as the need for more data to train AI algorithms effectively and the development of more sophisticated algorithms to handle the complexity of financial data and tasks (Farishy, 2023).

The future of AI in the banking sector is likely to be characterized by increased personalization, efficiency, and innovation. AI will be used to analyze customer data to provide tailored products and services, streamline processes, and reduce costs. While AI may automate certain tasks and potentially displace some jobs, it will also create new opportunities in areas such as data analysis, programming, and further AI development (Boustani, 2022).

The potential applications of generative AI within the enterprise are limitless and continually expanding. This technology may revolutionize every facet of business, from enhancing customer interactions in the contact center to driving innovation in marketing, product development, and content creation. Moreover, it can optimize human resources, elevate employee support, and redefine customer experiences (Taulli, 2023).

Research Methodology

The research methodology employed in this paper combines desk research with the analysis of the Evident AI Index and a case study of JPMorgan Chase. The research was conducted in the period from May to September 2024.

Desk research encompassed a thorough examination of various sources, such as books, academic papers, industry reports, and case studies related to the application of AI in the banking sector. The literature review aims to understand the current state of AI adoption in banking, identify key trends and challenges, and analyze specific use cases of AI implementation. In addition to the literature review, the paper also explores the Evident AI Index, a ranking system that assesses the maturity of AI adoption among the world’s largest banks. This index evaluates banks based on four pillars: talent, innovation, leadership, and transparency. By analyzing the index scores, the paper gains insights into the relative progress of different banks in their AI journeys and identifies leaders in the field. Furthermore, the paper presents a case study of JPMorgan Chase, a leading global bank that has been actively integrating AI into its operations. The case study examines specific AI applications within JPMorgan Chase, such as AI-powered trading, risk management, fraud detection, customer service, and cybersecurity. By examining this case study, the paper provides a practical example of how AI is being leveraged to enhance efficiency, improve decision-making, and drive innovation in the banking sector.

As a result, this paper allows for a thorough examination of the topic, providing both theoretical insights and practical examples of AI implementation in the banking sector.

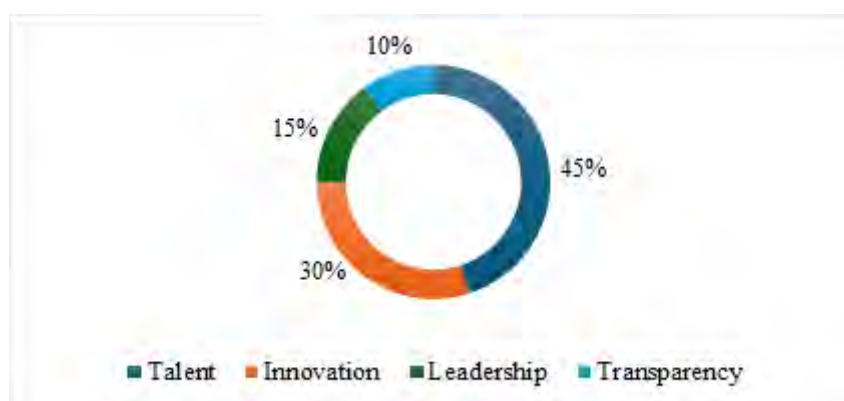
Research Results: Structure of Evident AI Index and Rank of the Banks

The Evident AI Index is a comprehensive ranking system designed to assess the maturity of AI adoption and implementation within the banking sector. It evaluates 50 of the world's largest banks based on over 100 individual indicators, categorized into four pillars (Evident Insights, 2023):

- **Talent:** This pillar assesses the quantity, quality, and development of AI and data professionals within the bank. It considers factors such as the number of AI employees, their academic backgrounds, and the bank's initiatives to attract, retain, and upskill talent in this field.
- **Innovation:** This pillar evaluates the bank's investment in AI innovation, including research output, patent filings, ventures, partnerships, and engagement with the open-source community. It assesses the bank's ability to develop and adopt cutting-edge AI technologies.
- **Leadership:** This pillar measures the AI focus of the bank's leadership team, as reflected in their communication strategy, executive positioning, and external engagement on AI topics. It assesses the commitment and vision of the bank's leaders in driving AI transformation.
- **Transparency:** This pillar examines the bank's transparency regarding its responsible AI practices. It considers factors such as the presence of dedicated responsible AI teams, publication of ethical principles, and communication of responsible AI initiatives.

The AI Index is calculated using a weighted scoring system, where each pillar contributes a specific percentage to the overall score. The weights assigned to each pillar are as follows (Evident Insights, 2023): talent (45%), innovation (30%), leadership (15%), and transparency (10%) (Figure 1).

Figure 1 - Weighed scoring system in Evident AI Index



Source: Adapted from Evident Insights (2023). *The Evident AI Index Key Findings Report: The global standard benchmark of AI maturity.* Evident Insights.

Each bank is evaluated on the individual indicators within each pillar, and their performance is converted into a score. The weighted average of the scores across all four pillars determines the bank's overall AI Index ranking.

The Evident AI Index relies solely on publicly available information, ensuring an independent and unbiased assessment of each bank's AI maturity. It serves as a valuable tool for banks, investors, and advisors to track progress, identify best practices, and make informed decisions regarding AI adoption and transformation in the banking sector. The Evident AI Index is important for the following reasons (Evident Insights, 2023):

- Benchmarking and tracking progress: The index allows banks to assess their AI maturity compared to their peers and track their progress over time. This helps them identify areas where they are excelling and areas where they need to improve.
- Identifying best practices: By ranking banks based on various AI-related criteria, the index highlights institutions that are leading the way in AI adoption. This allows other banks to learn from their successes and adopt best practices.
- Informing strategic decision-making: The index provides valuable insights into the different approaches banks are taking to AI adoption. This information can help banks make more informed decisions about their own AI strategies and investments.
- Promoting transparency and responsibility: The index includes a pillar dedicated to transparency, encouraging banks to be more open about their responsible AI practices. This promotes greater accountability and trust in the use of AI in the financial sector.
- Driving competition and innovation: By showcasing the leaders in AI adoption, the index fosters a competitive environment that encourages banks to innovate and accelerate their AI transformation efforts.

In table 3 are presented the top ten banks according to Evident AI Index for 2023 year. JPMorgan Chase is in first place according to the values of Evident AI Index.

Table 3 - The Top Ten Banks According to Evident AI Index

Bank	Rank	Talent	Innovation	Leadership	Transparency
JPMorgan Chase	1	2	1	2	1
Capital One	2	1	2	8	5
Royal Bank of Canada	3	7	3	5	2
Wells Fargo	4	4	5	32	10
UBS	5	3	19	17	22
CommBank	6	16	20	3	4
Goldman Sachs	7	8	4	15	49
ING	8	6	10	19	15
Citigroup	9	5	8	26	31
DBS	10	22	34	1	12

Source: adapted from Evident Insights (2023). The Evident AI Index Key Findings Report: The global standard benchmark of AI maturity. Evident Insights.

Case study: JPMorgan Chase

JPMorgan Chase is a global financial services firm with a rich history of over two centuries. It provides a variety of financial services including asset management, commercial banking, consumer banking, and investment banking, while its key business principles are: exceptional client service, operational excellence, a commitment to integrity and a winning culture. JPMorgan Chase strives to exceed its customers' expectations by providing them with high-quality products and services. The company also emphasizes acting with integrity and fairness in all business areas and relationships. JPMorgan Chase believes that a strong organizational culture is essential to its success, and it fosters a teamwork (<https://www.jpmorganchase.com/about/business-principles>).

JPMorgan Chase has been at the forefront of integrating AI into its operations, products, and services. This case study presents JPMorgan Chase's strategic approach to AI, highlighting key use cases, organizational structures, and the impact of AI on the company's performance and the broader financial landscape. JPMorgan Chase uses AI in various areas, such as risk management, fraud detection, trading, and customer service. It has developed its own AI-powered virtual assistant for corporate clients and is actively exploring the use of generative AI. JPMorgan Chase's dominance is a direct result of its investment in AI research talent. The bank employs over 200 AI researchers (Business Wire, 2024). It has a dedicated AI research team that collaborates with academic institutions and industry partners to explore cutting-edge AI technologies. Furthermore, JPMorgan Chase has also established an Explainable AI Center of Excellence (XAI COE) to foster collaboration across the organization and ensure that AI initiatives are aligned with business goals (<https://www.jpmorgan.com/technology/artificial-intelligence/initiatives/explainable-ai-center-of-excellence>). AI is used to automate tasks, improve decision-making, and create new products and services. Here are some of the ways JPMorgan Chase is using AI (Erdoes, 2024):

- Identify opportunities to embed AI throughout the company.
- Automate tasks and run the business more efficiently.
- Partner with experts or individuals who have knowledge and understanding of AI to help leaders identify all the opportunities.

Table 4 features the key AI applications in JPMorgan Chase.

Table 4 - AI Applications in JPMorgan Chase

AI Application	Description	Impact
Trading and risk management		
Algorithmic trading	AI algorithms execute high-speed trades and monitor portfolio performance.	Improves trade execution and risk management.
Risk estimation	Machine learning models analyze vast amounts of data to assess credit risks, market volatility, and potential opportunities.	Enhances the bank's ability to manage risks effectively.
Fraud detection	AI-powered systems continuously monitor transactions to identify suspicious activity in real time.	Reduces financial losses due to fraud and strengthens security.

Customer-centric initiatives		
Chatbots and virtual assistants	AI-powered chatbots and virtual assistants provide immediate customer support and answer queries.	Enhances customer service efficiency and accessibility.
Personalized recommendations	AI algorithms analyze customer transaction history and behavior to offer tailored product suggestions.	Boosts cross-selling opportunities by identifying relevant products for clients.
Credit scoring	AI models assess creditworthiness more accurately than traditional methods.	Enables the bank to extend loans and credit to a wider range of customers with improved risk assessment.
Operational excellence		
Data analytics	Machine learning and big data analytics help the bank extract valuable insights from massive datasets.	Informs strategic decision-making and improves risk management.
Automation	Robotic Process Automation (RPA) automates repetitive tasks.	Reduces operational costs, minimizes errors, and frees up employees for more complex tasks.
Anti-money laundering (AML)	AI algorithms enhance AML processes by identifying suspicious transactions and reducing false positives.	Increases the efficiency and accuracy of AML monitoring.
AI and cybersecurity		
Threat detection	AI-powered cybersecurity systems identify and neutralize cyber threats by analyzing patterns and anomalies in network traffic.	Strengthens the bank's security posture and reduces the risk of cyberattacks.
Sustainable finance		
ESG analytics	AI tools analyze environmental, social, and governance (ESG) data to assess sustainability-related investment risks and opportunities.	Supports the bank's commitment to responsible investing by aligning financial decisions with ESG factors.

Source: adapted from Verma, N. (2023). *JP Morgan Chase: Revolutionizing Banking Through AI – Case Study*, available on: <https://medium.com/@vermanikhil605/jp-morgan-chase-revolutionizing-banking-through-ai-case-study-a659c0b0957f> (Accessed 1 July 2024)

JPMorgan Chase's AI research goals are to leverage artificial intelligence to understand and manage complex economic systems, predict and prevent financial crime, enable secure data sharing, improve client experiences, empower employees, and ensure regulatory compliance. Its overarching objective is to develop and deploy ethical AI that benefits not only the company but also its clients, employees, and society as a whole (<https://www.jpmorgan.com/technology/artificial-intelligence>).

Current State of AI Usage in Banks in Serbia

AI has significant potential to provide valuable benefits in central banking systems (Martin, 2024). The National Bank of Serbia (NBS) utilizes a wide array of AI techniques for diverse purposes, such as (Tabaković, 2023):

- **Risk management and fraud detection:** The NBS employs predictive analytics and machine learning algorithms, specifically Self-Organizing Maps and Lasso logistic regression, in its early warning system to predict potential difficulties in banking operations. This allows for proactive monitoring and mitigation of risks.
- **Macroeconomic analysis:** Machine learning models are employed to assess the macroeconomic environment, aiding in stress testing scenarios for the banking sector. They also serve as a supporting tool in projecting the reference guide for the countercyclical capital buffer rate, contributing to financial stability.
- **Real-time inflation monitoring:** The NBS has developed an innovative inflation nowcasting model based on web scraping. This model automatically collects price data from over 130 websites, covering around 90% of the Consumer Price Index (CPI) basket. The collected data is then processed using automated algorithms to provide real-time insights into inflation trends. This enables the NBS to monitor inflation on a daily or weekly basis, allowing for timely policy interventions.

The NBS has effectively integrated AI into its operations, demonstrating a comprehensive approach to leveraging AI for various functions. The use of AI in risk management, fraud detection, macroeconomic analysis, and real-time inflation monitoring showcases the bank's commitment to innovation and data-driven decision-making.

Based on data from July 1, 2024, there are 20 commercial banks in the banking sector of Serbia, of which two are state banks, three domestic private banks and 15 foreign banks (https://www.nbs.rs/en/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/sistemski-znacajne-banke/index.html). The decision on determining the list of systemically significant banks in Serbia from May 10, 2024 highlighted that in Serbia nine banks represent systemically significant banks (https://nbs.rs/sr_RS/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/sistemski-znacajne-banke/). Survey conducted by the National Bank of Serbia in 2023 revealed that Serbian banks are utilizing AI in various ways. Seven banks employ predictive analytics, six utilize robotic process automation, four use machine learning, and three leverage real-time analytics (Table 5).

Table 5 - Use of AI in banks in Serbia

Use of AI	Number of banks	Percentage in relation to the total number of banks
Predictive analytics	7	35%
Robotic process automation	6	30%
Machine learning	4	20%
Real-time analytics	3	15%
Not use, but have intention to use	5	25%

Izvor: prilagođeno prema Tabaković, J. (2023). Governor Tabaković's speech at Finticipate vol. 2 – SEE Fintech Forum, dostupno na: <https://nbs.rs/en/scripts/showcontent/index.html?id=18981> (datum pristupa 1.7.2024)

The NBS did not name the banks that use AI in its report, nor did it detail their ownership structures. As a result, this paper only includes publicly available data that can be found by browsing bank websites and other public sources, and that refer to the use of AI in banks. According to available data there are four systemically significant banks in Serbia that use AI - Raiffeisen, Intesa Sanpaolo, UniCredit, and OTP bank, as well as one non-systemically significant bank - 3Banka. As a result, it can be concluded that 44.44% of Serbia's systemically significant banks use AI in their operations.

Raiffeisen bank led the way in Serbia by introducing a service powered by AI. Their electronic assistant, a chatbot named Rea (Raiffeisen Electronic Assistant), provides round-the-clock customer support across multiple platforms like Viber, Facebook, and the bank's website. Rea primarily answers questions about the bank's offerings but also educates users on other digital services. Initially designed to showcase the bank's products, Rea has evolved to assist registered users with various tasks, such as checking account balances, making payments, sending money via QR code, and paying bills (Dukić, 2023). By handling simple and common queries, Rea frees up bank staff to focus on clients with more complex needs. Rea operates in full compliance with electronic banking standards and the security and cultural norms of its environment. This commitment to security and ethical AI use is a hallmark of Raiffeisen's approach to technology (Buha & Bjegović, 2023). Beyond Rea, Raiffeisen leverages AI in other areas of its operations. For instance, the customer relationship management (CRM) system named Selecta (developed by Saga company (<https://selectacrm.app/?lang=sr>)) utilizes a 360° approach, building comprehensive user profiles based on interactions across various channels, including m-banking, email, chatbots, ATMs, contact centers, and branches. This integrated approach allows Raiffeisen to provide a more personalized and efficient customer experience (Buha & Bjegović, 2023).

Among other banks in Serbia, Intesa Sanpaolo's dedicated AI laboratory develops practical solutions and theoretical research to address the specific challenges of the business and financial sector. Leveraging a comprehensive knowledge base, their primary objective is to safeguard financial portfolios from significant market fluctuations. By harnessing the power of AI, the team can analyze vast sets of risk factors in mere seconds, drastically reducing the time it once took weeks to complete such analysis (Banka Intesa, 2021). Furthermore, Intesa Sanpaolo uses AI systems to automate business operations, provide customized offers for clients, target clients more precisely, and avoid frauds (Urošević, 2023).

AI continues to be prevalent in operations involving informing clients and communicating with them. UniCredit and OTP bank, for example, deploy virtual assistants, or chatbots, to answer a variety of client questions about products and services. OTP bank, in addition to the OTI chatbot, has been using AI in customer relationship management and the risk department for many years. Of the banks that are not categorized as systemically significant but use AI, 3Bank (better known as Opportunity Bank until 2021) deserves special mention. As early as 2015, this bank implemented a technical solution that, based on data obtained from the field, automatically generated loan approval decisions (Marković, 2023).

Conclusion

AI, particularly generative AI, is revolutionizing the banking sector. AI is being employed to enhance efficiency, improve customer service, and automate various processes within banks. Leading financial institutions like JPMorgan Chase have successfully integrated AI into their operations, leveraging it for tasks such as trading, risk management, fraud detection, customer service, and cybersecurity. Of the 20 banks operating in Serbia (as of July 1, 2024), seven use predictive analytics, six use robotic process automation, four use machine learning, and three use real-time analytics. Available data indicate that in Serbia, four out of a total of nine systemically significant banks apply AI in their operations. Also, it is important to point out that the National Bank of Serbia, as a central bank, applies AI for risk management, fraud detection, macroeconomic analysis and real-time inflation monitoring.

This paper offers several theoretical and practical implications for understanding and implementing AI in the banking sector. From a theoretical standpoint, the paper delves into the emerging field of generative AI, highlighting its potential to revolutionize various aspects of banking. It contributes to the growing body of knowledge on AI's role in the banking sector. It provides a comprehensive overview of AI technologies and their diverse applications in banking, enriching the theoretical understanding of this evolving field. The case study of JPMorgan Chase offers insights into how a leading bank is leveraging AI to enhance its operations and performance. This analysis contributes to the theoretical understanding of the relationship between AI adoption and bank profitability.

From a practical standpoint, the paper provides valuable practical guidance for banks considering AI adoption. It outlines key decision areas for implementing a generative AI operating model, helping banks navigate the complexities of AI integration. The Evident AI Index, discussed in the paper, serves as a valuable tool for banks to benchmark their AI maturity against industry leaders and identify best practices. This can guide banks in developing effective AI strategies and maximizing the benefits of AI adoption.

The paper has some limitations. First of all, its orientation is only on a positive outlook on AI in banking, highlighting its potential benefits. However, it lacks a critical analysis of the potential risks and challenges associated with AI adoption, such as job displacement and cybersecurity threats. While the paper references various sources, it relies heavily on secondary data which may be prone to biases and subjectivity.

The proposition for future research is to conduct a more balanced discussion of both the positive and negative aspects of AI and to conduct research based on collection of primary data. More specifically, it is suggested to carry out research through questionnaires or interviews with bank employees, bank clients, as well as with experts in the field of AI and finance. This approach would enable the collection of qualitative and quantitative data that would provide a broader overview of the impact of AI on the banking sector, as well as the perception and experiences of various actors

References

1. Al-Hawamdeh, S., & Alshaer, M. M. (2022). Artificial Intelligence Applications as a Modern Trend to Achieve Organizational Innovation in Jordanian Commercial Banks. *Journal of Asian Finance Economics and Business*, 9(3), 257-263. <https://doi.org/10.13106/jafeb.2022.vol9.no3.0257>
2. Banka Intesa (2021). Veštačka inteligencija je tu da ostane, dostupno na: <https://www.banccaintesa.rs/stanovnistvo/nas-svet/upoznajte-nas-svet/vestacka-inteligencija-trajno-resenje.html> (datum pristupa 1.7.2024)
3. Boustani, N. M. (2022). Artificial intelligence impact on banks clients and employees in an Asian developing country. *Journal of Asia Business Studies*, 16(2), 267-278. <https://doi.org/10.1108/JABS-09-2020-0376>
4. Buehler, K., Corsi, A., Jurisic, M., Lerner, L., Siani, A., & Weintraub, B. (2024). Scaling gen AI in banking: Choosing the best operating model, dostupno na: <https://www.mckinsey.com/industries/financial-services/our-insights/scaling-gen-ai-in-banking-choosing-the-best-operating-model#/> (datum pristupa 4.7.2024)
5. Buha, V., & Bjegović, M. (2023). Application of artificial intelligence in the banking sector. *Bezbednost*, 65(1), 87-106. DOI: 10.5937/bezbednost2301087B
6. Burgess, A. (2017). *The executive guide to artificial intelligence: How to find and implement applications for AI in your organization*. Springer, Cham, Switzerland.
7. Business Wire (2024). JPMorgan Chase Dominates AI Research In Banking As Future Challengers Emerge, dostupno na: <https://aijourn.com/jpmorgan-chase-dominates-ai-research-in-banking-as-future-challengers-emerge/> (datum pristupa 4.7.2024)
8. Dukić, M. (2023). Kako veštačka inteligencija može da se upotrebi u bankarstvu?, dostupno na: <https://www.kamatica.com/analiza/kako-vestacka-inteligencija-moze-da-se-upotrebi-u-bankarstvu/70096> (datum pristupa 7.7.2024)
9. Erdoes, M. (2024). Leading with AI, dostupno na: <https://www.jpmorgan.com/technology/news/leading-with-AI> (pristupljeno 6.7.2024)
10. Evident Insights (2023). *The Evident AI Index Key Findings Report: The global standard benchmark of AI maturity*. Evident Insights.
11. Farishy, R. (2023). The Use of Artificial Intelligence in Banking Industry. *International Journal of Social Service and Research*, 3(7), 1724-1731.
12. Funcas (2021). *The Future of Banking Jobs. A Sector in Transformation*. Funcas.
13. Ghandour, A. (2021). Opportunities and challenges of artificial intelligence in banking: Systematic literature review. *TEM Journal*, 10(4), 1581-1587. <https://doi.org/10.18421/TEM104-12>
14. Kaya, O. (2019). *Artificial intelligence in banking: A lever for profitability with limited implementation to date* (EU Monitor). Deutsche Bank Research.
15. Marković, K. (2023). Veštačka inteligencija među bankarima, dostupno na: <https://bonitet.com/vestacka-inteligencija-medju-bankarima/> (datum pristupa 9. 9. 2024).
16. Martin, V. (2024). Integrating artificial intelligence into central banking: Opportunities, challenges, and implications. *Journal of Process Management and New Technologies*, 12(1-2), 49-60.
17. McMullen, M. (2023). AI in Finance - 5 Benefits for Better Banking. Towards AWS, dostupno na: <https://towardsaws.com/ai-in-finance-5-benefits-for-better-banking-70cbaae31911> (datum pristupa 5.7.2024)
18. Nicoletti, B. (2021). *Banking 5.0. How Fintech will Change Traditional Banks in the "New Normal" Post Pandemic*. Palgrave Studies in Financial Service Technology. Switzerland: Palgrave MacMillan.
19. Nowakowski, M. (2024). Ethical FinTech: The Importance of Ethics in Creating Secure Financial Products and Services. In: Lasak, P., & Williams, J. (Eds.), *Digital Transformation and the Economics of Banking*.

20. Omarini, A. (2024). From Digital Technologies to New Economics in Banking: How to Drive the Future of Digital Money and Data Information Knowledge. In: Lasak, P., & Williams, J. (Eds.), *Digital Transformation and the Economics of Banking. Economic, Institutional and Social Dimensions* (pp. 31-49). London and New York: Routledge, Taylor & Francis Group.
21. Šehović, D. (2017). Sajber otpornost finansijskih institucija. *Bankarstvo*, 46(4), 134-151. <https://doi.org/10.5937/bankarstvo1704134S>
22. Skilton, M., & Hovsepian, F. (2017). *The 4th industrial revolution: Responding to the impact of artificial intelligence on bussiness*. Springer. Cham, Switzerland.
23. Stojmenović, M. (2020). Društveno-ekonomski aspekti povlačenja gotovine iz upotrebe. *Bankarstvo*, 49(3), 102-127. <https://doi.org/10.5937/bankarstvo2003102S>
24. Tabaković, J. (2023). Governor Tabaković's speech at Finticipate vol. 2 – SEE Fintech Forum, dostupno na: <https://nbs.rs/en/scripts/showcontent/index.html?id=18981> (datum pristupa 1.7.2024)
25. Taulli, T. (2023). *Generative AI: How ChatGPT and Other AI Tools Will Revolutionize Business*. Apress. <https://doi.org/10.1007/978-1-4842-9367-6>
26. Urošević, B. (2023). Od sprečavanja zločina do procene rizika – kako srpske banke koriste AI, dostupno na: <https://rs.bloombergadria.com/a-c/tehnologija/digitalizacija/58637/ai-malim-bankama-moze-da-pomogne-da-stignu-velike> (datum pristupa 9.9.2024)
27. Verma, N. (2023). JP Morgan Chase: Revolutionizing Banking Through AI – Case Study, dostupno na: <https://medium.com/@vermanikhil605/jp-morgan-chase-revolutionizing-banking-through-ai-case-study-a659c0b0957f> (datum pristupa 1.7.2024)
28. Waliszewski, K. (2024). Banking-as-a-Service and Embedded Banking as Innovative Methods of Providing Banking Services. In: Lasak, P., & Williams, J. (Eds.), *Digital Transformation and the Economics of Banking. Economic, Institutional and Social Dimensions* (pp. 50-66). London and New York: Routledge, Taylor & Francis Group.
29. <https://www.jpmorganchase.com/about/business-principles> (datum pristupa 1.7.2024)
30. <https://www.jpmorgan.com/technology/artificial-intelligence> (datum pristupa 1.7.2024)
31. <https://www.jpmorgan.com/technology/artificial-intelligence/initiatives/explainable-ai-center-of-excellence> (datum pristupa 1.7.2024)
32. <https://selectacrm.app/?lang=sr> (datum pristupa 10.7.2024)
33. <https://www.nbs.rs/sr/finansijske-institucije/banke/spisak-banaka/> (datum pristupa 9.9.2024)
34. https://nbs.rs/sr_RS/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/sistemi-znacajne-banke/ (datum pristupa 9.9.2024)

Datum prijema: 10.09.2024. god.
Datum prihvatanja: 17.10.2024. god.

DOI: 10.5937/bankarstvo2403086S

VAŽNOST RAZVOJA REGIONALNOG OKVIRA ZA TAKSONOMIJE ODRŽIVOG FINANSIRANJA

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Rezime: Ovaj članak istražuje značaj razvoja regionalnog okvira za taksonomije održivog finansiranja na Zapadnom Balkanu. Poticanjem koordinisanog pristupa, Zapadni Balkan može poboljšati usklađenost sa EU taksonomijom, privući međunarodne investicije i efikasnije sprovesti svoje napore ka zelenoj tranziciji. Članak raspravlja o trenutnom prihvatanju održivog finansiranja na Zapadnom Balkanu, identifikuje zajedničke izazove i prepreke, te iznosi detaljan plan za razvoj regionalnog okvira za taksonomije. Ključne preporuke uključuju uspostavljanje regionalnog koordinacionog tela, usklađivanje sa ciljevima održivosti kao što su Nacionalno utvrđeni doprinosi (NDC), fokusiranje na sektore sa najvećim uticajem i primenu faznog pristupa implementaciji. Preporučuje se fazni pristup počevši od belog spiska specifičnih održivih aktivnosti i postepeno uključivanje detaljnijih kriterijuma kako se kapaciteti učesnika budu poboljšavali. Članak naglašava potencijal jedinstvene taksonomije za unapređenje regionalne saradnje, privlačenje međunarodnih investicija i podsticanje održivog ekonomskog razvoja na Zapadnom Balkanu. Takođe se ističe potreba za kontinuiranim praćenjem, angažovanjem zainteresovanih strana i izgradnjom kapaciteta, kako bi se osigurala efektivnost i relevantnost okvira.

Ključne reči: ESG, EU taksonomija, održivo finansiranje, taksonomija održivog finansiranja, Zapadni Balkan.

JEL klasifikacija: F55, G18, G28, Q56

Uvod

Održivo finansiranje je sve više prepoznato kao ključni faktor u rešavanju globalnih pitanja životne sredine i jačanju ekonomske otpornosti. Ono obuhvata finansijske aktivnosti koje integrišu ekološke, socijalne i upravljačke (ESG) kriterijume kako bi se podstakao dugoročni održivi razvoj. Osnovna komponenta u oblasti održivog finansiranja je taksonomija, koja nudi sistematski metod za identifikaciju i procenu ekonomski održivih aktivnosti.

Održivo finansiranje transformiše bankarski sektor integracijom zelenih politika u sve operacije, pri čemu su glavne finansijske institucije, poput Evropske investicione banke i Evropske banke za obnovu i razvoj, posvećene zelenim investicijama u celom portfoliju. Banke preusmeravaju fokus sa toga šta finansiraju na način kako finansiraju, s ciljem smanjenja emisija, podrške odgovornim investicijama i integracije ESG kriterijuma u svoje osnovne aktivnosti. Proaktivan angažman globalnih banaka u održivim inicijativama – poput ciljeva Deutsche Bank-a i saradnje Evropske bankarske federacije na EU taksonomiji – pokazuje promenu ka potpuno održivom pristupu finansiranju, utičući na preferencije investitora ka ekološki prihvatljivim opcijama (Sredojević & Sredojević, 2021).

Finansijski sektori na Zapadnom Balkanu (ZB) uglavnom su sastavljeni od banaka, koje čine 80-90% ukupne imovine finansijskog sektora, s tim da je Kosovo¹ izuzetak sa 68% u 2020. godini, zbog svog značajnog i rastućeg sektora privatnih penzionih fondova. Ostali finansijski posrednici, poput osiguravajućih društava, penzionih i investicionih fondova i berzi, igraju relativno manju ulogu u finansijskom tržištu regiona. Značajan broj ovih banaka u vlasništvu je stranih, pretežno EU banaka-matičnih društava. Ovo strano vlasništvo je olakšalo usvajanje modernih poslovnih modela i naprednih informacionih i komunikacionih tehnologija (IKT), ali je takođe dovelo do prekomernog zaduživanja pre globalne finansijske krize, što je potvrđeno visokim odnosom kredita prema depozitima. Bečka inicijativa, pokrenuta 2009. godine od strane Evropske banke za obnovu i razvoj (EBRD), Evropske investicione banke (EIB), Evropske komisije (EK), Međunarodnog monetarnog fonda (MMF) i Svetske banke (SB), igrala je ključnu ulogu u sprečavanju haotičnog povlačenja kapitala od strane banaka-matičnih društava na ZB, čime je očuvana finansijska stabilnost nakon krize. Trenutno, komercijalne banke na ZB održavaju zdrave stope kapitalizacije i likvidnosti, prvenstveno podržane depozitima. Uprkos ovim napretcima, penetracija bankarskog sektora ostaje relativno niska. Dubina finansijskog sektora, obično mereno ukupnom imovinom ili kreditima privatnom sektoru u odnosu na BDP, obično je pozitivno povezana sa ekonomskim razvojem, iako prekomerni nivoi mogu dovesti do kriza. Imovina bankarskog sektora na ZB prosečno iznosi ispod 100% BDP-a, što je niže od proseka evrozona od 280% BDP-a u 2021. godini (EBRD, 2024).

ZB ulaže napore da integriše principe održivog finansiranja u svoje finansijske sisteme. Međutim, region se suočava sa raznim izazovima, poput nedostatka standardizovanih okvira, ograničenih tehničkih kapaciteta i male veličine tržišta. Usklađivanje sa taksonomijom Evropske unije (EU), detaljnim klasifikacionim sistemom dizajniranim da vodi održive investicije, predstavlja i prilike i izazove za ove zemlje.

¹ Sve reference na Kosovo, bilo na teritoriju, institucije ili stanovništvo, u ovom tekstu treba razumeti u punoj saglasnosti sa Rezolucijom 1244 Saveta bezbednosti Ujedinjenih nacija i bez prejudiciranja statusa Kosova.

U svojoj studiji o zelenom finansiranju na ZB, Limani nalazi da, iako su zemlje ZB uložile napore da usvoje strategije zelenog finansiranja i usklade se sa međunarodnim sporazumima, poput Kjoto protokola i Pariskog sporazuma, one i dalje ostaju u ranim fazama razvoja održivih ekonomija. Uprkos sredstvima iz EU i međunarodnih fondova, izazovi ostaju zbog nedovoljne institucionalne pripremljenosti, nedostatka kvalifikovanog osoblja i problema u usklađenosti, što stvara birokratske i pravne prepreke koje otežavaju zelenu transformaciju. Limani naglašava potrebu za daljim istraživanjem ovih prepreka kako bi se pružile konkretne preporuke za unapređenje zelenog finansiranja u regionu (Limani, 2024).

Mulita istražuje kako zeleno finansiranje podržava održivi razvoj na ZN kroz olakšavanje ulaganja u obnovljive izvore energije, održivu infrastrukturu i inkluzivan rast, pri čemu EU i međunarodne finansijske institucije igraju ključnu ulogu. Iako održivo finansiranje dobija na zamahu u regionu, izazovi kao što su ograničen pristup finansijama, nedostatak svesti i regulatorne praznine i dalje traju, što zahteva dodatne intervencije u politici, poboljšanja u zakonodavstvu i fiskalne podsticaje za napredak zelenog finansiranja i postizanje ciljeva održivosti (Mulita, 2023).

EU taksonomija za održive aktivnosti definiše ekonomske aktivnosti koje su okolinski održive, pomažući investitorima i kompanijama da razumeju šta se kvalifikuje kao održivo. Ovaj klasifikacioni sistem pruža preduzećima i investitorima zajednički jezik, osiguravajući da investicije značajno doprinose barem jednom od šest ekoloških ciljeva: ublažavanju klimatskih promena, prilagođavanju klimatskim promenama, održivom korišćenju i zaštiti voda i morskih resursa, tranziciji ka cirkularnoj ekonomiji, prevenciji i kontroli zagađenja, te zaštiti i obnovi biodiverziteta i ekosistema (European Commission, 2024). Od aprila 2024. godine, postoji 47 taksonomija za održivo finansiranje (od jednostavnih do složenijih). Trenutno, tri četvrtine razvijenih ekonomija sada pokriva taksonomija na nivou ekonomije ili regiona, dok je nešto više od 10% tržišta u razvoju i zemalja u razvoju pokriveno (SBFN, 2024).

Schütze i Stede ističu da EU taksonomija ima za cilj usmeriti investicije ka nisko-karbonskim aktivnostima kroz transparentne i standardizovane ekološke informacije. Oni nalaze da, iako taksonomija pokriva sektore s visokim emisijama, ne podstiče dovoljno razvoj naprednih tehnologija za dekarbonizaciju i nedostaju joj jasni putevi ka klimatskoj neutralnosti u nekim sektorima (npr. zgrade, osnovni materijali). Predlažu dodatne kriterijume, kao što je „smeđa taksonomija“ za neodržive aktivnosti, kako bi se poboljšalo usmeravanje investitora i sprečilo ulaganje u karbonski intenzivne resurse, sugerišući prilagođavanja kako bi taksonomija bila sveobuhvatnija i podržala dugoročne klimatske ciljeve (Schützea & Stede, 2024).

Ovaj članak uglavnom proizilazi iz projekta „Tehnička pomoć za procenu finansijskog pejzaža na Zapadnom Balkanu u vezi sa perspektivama taksonomije održivog finansiranja“ inicijative Saveta za regionalnu saradnju (RCC) u okviru Akcionog plana zajedničkog regionalnog tržišta (CRM) 2021–2024. Ovaj projekat ima za cilj da sveobuhvatno proceni pejzaž održivog finansiranja na ZB i razvije preporuke za okvir taksonomije održivog finansiranja koji je usklađen sa propisima EU i međunarodnim standardima.

Cilj ovog članka je da istakne značaj kreiranja regionalnog okvira za taksonomije održivog finansiranja na ZB. Promišući koordinisan pristup, ZB može poboljšati svoju usklađenost sa EU taksonomijom, privući međunarodne investicije i efikasno unaprediti svoje napore ka zelenoj tranziciji. U narednim odeljcima će biti pružena analiza trenutnog stanja održivog finansiranja na ZB, raspravljani uobičajeni izazovi sa kojima se region suočava i iznet plan za razvoj regionalnog okvira taksonomije koji se pridržava međunarodnih standarda. Ovaj sveobuhvatni pregled ima za cilj da ponudi dragocene uvide i praktične smernice za donosiocje odluka, finansijske institucije i druge zainteresovane strane na ZB.

Pejzaž održivog finansiranja na Zapadnom Balkanu

Održivo finansiranje dobija na zamahu globalno, vođeno regulatornim inicijativama, dobrovoljnim smernicama i standardima vođenim tržištem. Principi Ujedinjenih nacija za odgovorna ulaganja (PRI) podstiču investitore da uključe ESG razmatranja u svoje procese donošenja odluka. Radna grupa za klimatske finansijske izveštaje (TCFD) daje preporuke kompanijama za klimatske finansijske izveštaje, promovišući transparentnost i odgovornost. Pored toga, Ekvatorijalni principi nude smernice za upravljanje ekološkim i društvenim rizicima u projektima finansiranja. EU taksonomija predstavlja značajan regulatorni okvir koji vodi kompanije u identifikaciji i izveštavanju o ekološki održivim aktivnostima. Ovi okviri imaju za cilj usmeravanje kapitala ka održivim investicijama, povećanje transparentnosti i podršku globalnim klimatskim ciljevima.

U Albaniji, Zajednički program UN-a „Strateške političke opcije za finansiranje ciljeva održivog razvoja“ ima za cilj podršku finansiranju povezanom sa ciljevima održivog razvoja Ujedinjenih nacija (SDG). Od jula 2017. godine, banka Albanije (BoA) je deo „Globalne rezolucije o održivom razvoju“, ističući važnost finansijskog sektora u ispunjavanju Principa UN SDG i projekata iz Pariskog sporazuma (COP21). U decembru 2020. godine, BoA se pridružila mrežama centralnih banaka i supervizora za ozelenjavanje finansijskog sistema (NGFS), naglašavajući „zeleni“ sadržaj (BoA, 2023). BoA je uspostavila radnu grupu na visokom nivou posvećenu održivom finansiranju i razvila srednjoročnu strategiju zelene finansije u saradnji sa Svetskom bankom. Ova strategija uključuje upravljanje klimatskim rizicima unutar bankarskog sektora i razvoj zelene kontrolne table za premošćavanje nedostataka u podacima koji se odnose na klimatske finansije. Agencija za nadzor finansija Albanije (AFSA), u skladu sa akcionim planom za održivo finansiranje, u skladu sa praksama EU (npr. standard EU za zelene obveznice), ima za cilj uspostavljanje standarda za izdavanje zelenih obveznica (AFSA, 2023).

Finansijske institucije u Albaniji počinju da klasifikuju zelene aktivnosti prvenstveno na osnovu smernica BoA i zelene kontrolne table. Fokus je na energetske efikasnosti (EE) i obnovljivim izvorima energije (OIE), pri čemu veće banke imaju naprednije sisteme zbog svoje povezanosti sa EU-matičnim kompanijama. Zeleni krediti i zelene obveznice se uvode, iako njihova penetracija na tržištu ostaje ograničena. BoA planira da implementira pokazatelje održivosti putem NGFS Zelene kontrolne table radi praćenja finansijske stabilnosti, sprovođenja redovnih korporativnih anketa o zelenim praksama, izdavanja smernica zasnovanih na principima klimatskih rizika za supervizorske diskusije i održavanja čestih okruglih stolova sa licenciranim institucijama, kako bi se rešavali izazovi zelene finansije i podizala svest (BoA, 2023).

Bosna i Hercegovina (BiH) beleži postepen porast u primeni održivog finansiranja, prvenstveno vođenog međunarodnim organizacijama poput Svetske banke i EBRD-a. Napori finansijskog sektora u oblasti zelenog finansiranja uglavnom su usmereni na pojedince i javne institucije, sa fokusom na mere EE. Centralna banka Bosne i Hercegovine (CBBiH) postavila je strateške ciljeve za poboljšanje finansijske stabilnosti i inkluzije, indirektno usklađujući se sa principima održivog finansiranja. Strateški plan CBBiH-a naglašava značaj usklađivanja sa standardima EU i međunarodnim standardima kako bi se poboljšao kvalitet i pravovremenost zvaničnih statistika vezanih za finansijsku stabilnost i ekonomski razvoj (CBBH, 2022). Međutim, nedostatak sveobuhvatnog regulatornog okvira i standardizovanih metodologija za izveštavanje i usklađenost ostaje značajan izazov. Ponuda zelenih finansijskih proizvoda ostaje skromna, pri čemu komercijalne banke često usvajaju ESG politike zbog zahteva matičnih grupacija (onih sa sedištem u EU), što rezultira zanemarljivim udelom zelenih finansijskih proizvoda (manje od 2% u privatnom sektoru u 2021. godini). Međunarodne finansijske institucije igraju ključnu ulogu finansirajući javni sektor putem

partnerskih institucija, sa ograničenim direktnim ulaganjima u privatne kompanije (Suljić, 2021). U 2024. godini, CBBiH je podnela zahtev za članstvo u NGFS, te je u avgustu postala i članica.

Napori ka uspostavljanju okvira za održivo finansiranje su fragmentisani i prvenstveno vođeni međunarodnim organizacijama poput Svetske Banke kroz obrazovne seminare i program PULSAR (Program za javno računovodstvo i izveštavanje). Trenutno postoji ograničena koordinacija između Ministarstva finansija i trezora BiH i finansijskih tela na nivou entiteta u vezi sa projektima održivog finansiranja. Obe agencije za bankarstvo, Agencija za bankarstvo FBiH (FBA) i Agencija za bankarstvo Republike Srpske (BARS), postavile su strateške prioritete za upravljanje i nadzor klimatskih i ekoloških rizika u bankarskom sektoru za period 2023-2025. Federalna agencija za bankarstvo (FBA) i Agencija za bankarstvo Republike Srpske (BARS) u Bosni i Hercegovini prioritetno se bave upravljanjem klimatskim i ekološkim rizicima u bankarskom sektoru za period 2023-2025. Dok FBA podržava zeleno finansiranje i podstiče banke da razvijaju taksonomije usklađene sa EU taksonomijom, BARS se fokusira na integraciju klimatskih rizika u okvire upravljanja rizicima i preporučuje primenu međunarodnih najboljih praksi za održivo finansiranje (FBA, 2023) (BARS, 2023).

U praksi, finansijske institucije u BiH klasifikuju zelene aktivnosti na osnovu internih smernica, često pod uticajem svojih matičnih kompanija u EU. Fokus je na EE, OIE i nekim društvenim komponentama, prvenstveno kroz zelene kredite. U poređenju sa globalnim najboljim praksama, finansijske institucije u BiH su u ranim fazama usvajanja sveobuhvatnih okvira za održivo finansiranje, tj. još uvek razvijaju osnovne okvire i alate, što ukazuje na značajan zaostatak u poređenju sa naprednijim praksama.

Kosovo* napreduje u održivom finansiranju, uprkos nedostatku naprednih proizvoda održivog finansiranja, poput zelenih obveznica. Centralna banka Kosova (CBK) bila je proaktivna u podsticanju finansijskih institucija da ugrade ESG faktore u svoje operacije. Nedavno usvajanje Zakona o održivim investicijama ima za cilj stvaranje sveobuhvatnog pravnog okvira za promovisanje održivih ulaganja. CBK takođe radi na strategiji klimatskih rizika kako bi se klimatski rizici integrisali u regulatorni okvir. Projekt Svetske Banke FinSAC pružio je ključnu tehničku pomoć Kosovu, fokusirajući se na reforme finansijske stabilnosti i usklađivanje sa međunarodnim standardima. Ključni projekti podržali su CBK u zelenom finansiranju, rešavanju banaka i nadzoru zasnovanom na riziku. Aktivnosti su uključivale razvoj strategije klimatskih rizika i unapređenje upravljanja klimatskim rizicima. Uprkos odlaganjima zbog strukturnih promena u CBK, naponi FinSAC-a unapredili su regulatorne okvire Kosova, sa više pomoći koja se očekuje 2024. godine (FinSAC, 2024). Program Resilience and Sustainability Facility (RSF) podržava sprovođenje agende reformi u oblasti energije i klime. RSF finansiranje je proširilo fiskalni prostor za sprovođenje mera usmerenih na povećanje udela obnovljivih izvora energije i zaštitu ugroženih energetskih potrošača (IMF, 2023).

Međutim, izazovi poput nedostatka svesti i stručnosti, neadekvatne dostupnosti podataka i ograničene veličine tržišta i dalje postoje. Udruženje banaka Kosova (KBA) doprinosi obrazovanju o održivom finansiranju putem raznih treninga i seminara. Finansijske institucije na Kosovu klasifikuju zelene i održive aktivnosti na osnovu preliminarne strategije razvijenih u saradnji sa međunarodnim organizacijama. Ove klasifikacije prvenstveno se fokusiraju na EE i održivu poljoprivredu, sa inicijativama poput Kosovskog fond za kreditno jemstvo koje podržavaju zelene projekte. Međutim, nedostatak standardizovanih metoda klasifikacije dovodi do različitih pristupa među institucijama.

Posvećenost **Crne Gore** održivom finansiranju očigledna je u njenoj Nacionalnoj strategiji održivog razvoja do 2030. godine, koja naglašava integraciju ekoloških aspekata u finansijske sisteme. Prioritetizovanjem zelenog finansiranja, Crna Gora nastoji unaprediti upravljanje ekološkim otiskom i podsticati održive ekonomske prakse

koje su u skladu sa globalnim ciljevima Agende UN-a za održivi razvoj do 2030. godine (MSDT Mne, 2016).- Centralna banka Crne Gore (CBCG) usvojila je politiku promocije zelene ekonomije integrisanjem kriterijuma održivosti u svoje politike i podsticanjem zelenih finansijskih proizvoda. Plan održivog finansiranja CBCG-a fokusira se na razvoj taksonomije za održive aktivnosti i unapređenje angažmana zainteresovanih strana. Izazovi uključuju potrebu za izgradnjom kapaciteta i boljom koordinacijom među institucijama. Ključne institucije, poput Ministarstva ekonomije i Ministarstva finansija, rade na usklađivanju sa EU regulativama o održivom finansiranju.

Godišnji izveštaj CBCG-a za 2022. godinu ističe napredak u inicijativama za održivo finansiranje. Izveštaj naglašava važnost integracije međunarodnih standarda i najboljih praksi u lokalni finansijski sistem kako bi se poboljšala njegova otpornost i održivost. CBCG je aktivno angažovana na promociji ESG razmatranja unutar bankarskog sektora, usklađujući se sa širim direktivama EU i međunarodnim okvirima. U saradnji sa međunarodnim organizacijama poput Međunarodnog monetarnog fonda (MMF) i Svetske Banke, Crna Gora radi na izgradnji kapaciteta i podizanju svesti među finansijskim institucijama u vezi sa praksama održivog finansiranja (CBCG, 2023).

U Crnoj Gori, finansijske institucije klasifikuju zelene aktivnosti na osnovu međunarodnih smernica i okvira. Investiciono-razvojni fond Crne Gore nudi kreditne linije za zeleno finansiranje, prvenstveno usmerene na projekte OIE. Iako još uvek ne postoji zvanična taksonomija, institucije se oslanjaju na kriterijume postavljene od strane međunarodnih partnera, poput EBRD-a i Francuske agencije za razvoj (AFD).

Severna Makedonija je napravila napredak u usklađivanju sa EU regulativama i smernicama za održivo finansiranje. Narodna banka Republike Severne Makedonije (NBRM) izdala je smernice za upravljanje klimatskim rizicima i radi na sveobuhvatnom srednjoročnom planu za integraciju klimatskih rizika u finansijske analize. Makedonska berza je implementirala dobrovoljne ESG smernice za kompanije koje su uvrštene na berzu. Međutim, izazovi poput odsustva zelene taksonomije, nedostatka regulatornih smernica i neadekvatnih podataka otežavaju potpunu primenu prakse održivog finansiranja. Saradnja sa međunarodnim organizacijama poput EBRD-a i EIB-a pruža tehničku pomoć i finansiranje za podršku ovim naporima.

Istraživanje finansijskih institucija u Severnoj Makedoniji otkriva da oko 90% finansijskih institucija prepoznaje klimatske promene kao značajan rizik za finansijsku stabilnost, ali 87% banaka nije uspostavilo interne politike upravljanja klimatskim rizicima. Manje od polovine finansijskih institucija uvelo je nove zelene finansijske proizvode, prvenstveno kroz partnerstva sa EBRD-om. Glavni izazovi uključuju odsustvo regulatornih smernica, nedostatak standarda i alata, kao i neadekvatne podatke. Istraživanje naglašava potrebu za detaljnijim regulatornim okvirima i izgradnjom kapaciteta kako bi se uskladili sa EU standardima i efikasno upravljalo klimatskim rizicima (NBRM, 2022).

Finansijske institucije u Severnoj Makedoniji klasifikuju zelene i održive aktivnosti na osnovu kombinacije međunarodnih smernica i lokalnih praksi. Fokus je na zelenim kreditima i zelenim obveznicama, koje su podržane partnerstvima sa EBRD-om i drugim međunarodnim organizacijama. Odsustvo sveobuhvatne taksonomije dovodi do fragmentisanih sistema klasifikacije, pri čemu institucije koriste različite kriterijume u zavisnosti od svojih izvora finansiranja i regulatornih zahteva. Kao deo Strategije NBRM-a za upravljanje rizicima povezanim s klimom, Severna Makedonija je u februaru 2023. godine usvojila Odluku o metodologiji za upravljanje kreditnim rizikom, prema kojoj se od banaka očekuje da adekvatno uključe klimatske rizike u svoje upravljanje kreditnim rizikom počev od januara 2025. godine (European Commission, 2023).

Uprkos značajnom rastu, udeo zelenih kredita je na veoma niskom nivou. U periodu od 2019-2023. godine, povećao se sa 2,2% na 4,5%. Na dan 30. septembar 2023. godine, udeo zelenih kredita u ukupnim kreditima nefinansijskim entitetima u Severnoj Makedoniji bio je veoma nizak. Zeleni krediti za nefinansijske entitete činili su 8,8%, dok su zeleni krediti domaćinstvima predstavljali manji udeo, samo 0,5% njihovih ukupnih kredita. Iako je zaduživanje za zelene projekte poraslo za 2,1% u odnosu na 31. decembar 2022. godine, njegovo prisustvo u portfeljima banaka ostaje ograničeno (NBRM, 2023).

Dokument koji se odnosi na okvir za održivo finansiranje **Srbije** iznosi posvećenost ove zemlje održivom razvoju, fokusirajući se na ESG politike. Detaljno opisuje strategije Srbije za postizanje ciljeva održivog razvoja UN-a (SDG), podršku globalnoj dekarbonizaciji i promociju socijalne inkluzije. Ovaj okvir služi kao vodič za izdavanje zelenih, društvenih i instrumenata održivog finansiranja kako bi se prikupljala sredstva na međunarodnim tržištima kapitala (MoF Serbia, 2024). Posvećenost Srbije održivom finansiranju opisana je u njenom okviru za zelene obveznice, koji podržava izdavanje zelenih obveznica za različite sektore, uključujući OIE i održivo upravljanje vodama. Vlada Srbije usvojila je prvi okvir za izdavanje suverenih zelenih obveznica, koji detaljno opisuje proces definisanja, selekcije i izveštavanja o prihvatljivim zelenim troškovima, s ciljem izgradnje održive srpske ekonomije. Mesec dana kasnije, Srbija je emitovala prvu zelenu obveznicu na međunarodnim tržištima, prikupivši milijardu evra uz godišnju kamatnu stopu od 1% (UNDP, 2022). Narodna banka Srbije (NBS) radi na razvoju smernica za izdavaoce zelenih obveznica, uz saradnju sa UNDP-om na razvoju okvira za ove finansijske instrumente. Zakon o računovodstvu zahteva sveobuhvatne standarde za finansijsko i nefinansijsko izveštavanje, promovišući ESG obelodanjivanje. Uprkos ovim inicijativama, integracija zelenih finansijskih proizvoda u portfelje srpskih banaka ostaje ograničena, čineći mali procenat ukupnog portfelja. Ključne prepreke uključuju nedostatak stručnosti, neadekvatnu dostupnost podataka i različite nivoe spremnosti kompanija da usvoje održive prakse.

Integracija zelenih finansijskih proizvoda u portfelje srpskih banaka ostaje ograničena, pri čemu ti proizvodi čine približno 5-10% ukupnog portfelja u proseku. Uprkos rastućem naglasku na održivosti, mere zelenog finansiranja, poput zelenih kredita i zelenih obveznica, i dalje su nedovoljno zastupljene. Finansijske institucije u Srbiji klasifikuju zelene aktivnosti koristeći metodologije razvijene u saradnji sa međunarodnim partnerima. Fokus je na zelenim obveznicama i zelenim kreditima, pri čemu veće banke imaju naprednije sisteme klasifikacije zbog svoje povezanosti sa EU. Nedostatak standardizovanog pristupa rezultira različitim praksama među institucijama, naglašavajući potrebu za jedinstvenom taksonomijom.

Regionalni izazovi i prepreke

Zapadni Balkan se suočava sa brojnim izazovima i preprekama u usvajanju i integraciji praksi održivog finansiranja. Ove prepreke ometaju napredak regiona u usklađivanju sa međunarodnim standardima, kao što je EU taksonomija, i ostvarivanju punog potencijala održivog finansiranja. Evo glavnih izazova i prepreka zasnovanih na intervjuima sa različitim zainteresovanim stranama iz ZB-a i detaljnoj analizi:

Nedostatak svesti i razumevanja

Opšti nedostatak svesti i razumevanja principa održivog finansiranja među zainteresovanim stranama na ZB predstavlja značajnu prepreku za efikasno usvajanje i implementaciju praksi održivog finansiranja. Mnogi akteri nisu u potpunosti informisani o prednostima i zahtevima održivog finansiranja. Bez jasnog razumevanja principa održivog finansiranja, zainteresovane strane mogu potceniti potencijalne dugoročne ekonomske i ekološke koristi, kao što su povećana otpornost na klimatske rizike, poboljšani ugled i pristup novim tržištima i mogućnostima za finansiranje.

Pored toga, nedovoljno znanje o održivom finansiranju može dovesti do neefikasne implementacije povezanih inicijativa. Na primer, finansijske institucije se suočavaju sa poteškoćama u razvoju i upravljanju zelenim finansijskim proizvodima, dok korporacije imaju problem sa tačnim izveštavanjem o ESG faktorima. Donosioci politika se takođe suočavaju sa poteškoćama u kreiranju i sprovođenju regulativa koje podržavaju održivo finansiranje, bez dobrog razumevanja njegovih principa i praksi.

Nerazumevanje EU taksonomije

Nedostatak taksonomije za održivo finansiranje na ZB predstavlja značajan izazov za usklađivanje sa EU taksonomijom. Bez taksonomije, finansijske institucije se suočavaju sa nedoslednostima u definisanju i izveštavanju o održivim aktivnostima, što dovodi do fragmentisanih i često nekompatibilnih praksi. Ovaj problem dodatno otežava opšte nerazumevanje EU taksonomije među lokalnim akterima, uključujući finansijske institucije, korporacije i regulatorna tela (ministarstva i centralne banke). Mnogi, ali ne svi, vide zelenu taksonomiju samo kao alat za donošenje odluka o investicijama – kao „da/ne“ okvir. Iako taksonomija zaista pomaže u klasifikaciji koje su aktivnosti održive, ovaj ograničeni pogled propušta njen širi cilj.

Nedostatak snažne posvećenosti i otpor od strane zainteresovanih strana

Postoji primetan nedostatak snažne posvećenosti ključnih aktera, posebno ministarstava finansija i centralnih banaka na ZB. Kompleksnost i novitet okvira održivog finansiranja, kao što je EU taksonomija, doprinose otporu. Akteri mogu biti nevoljni da se obavežu na inicijative koje ne razumeju u potpunosti ili koje bi mogle narušiti postojeće finansijske i regulatorne sisteme. Pored toga, percipirani teret dodatnih regulatornih zahteva i zahteva za izveštavanje dodatno odvraća aktere od prihvatanja praksi održivog finansiranja. Bez jasnog liderstva i koordinacije, naponi ka usvajanju taksonomije održivog finansiranja su spori i neskladni.

Nedostatak postojećih okvira

Trenutno mnoge finansijske institucije i regulatorna tela na ZB nemaju uspostavljene okvire za vođenje aktivnosti održivog finansiranja. Ovaj nedostatak okvira vodi ka nekoliko problema. On ometa razvoj standardizovanih procedura za procenu i upravljanje ESG rizicima. Bez jasnih regulativa i metodologija, finansijske institucije i korporacije se suočavaju sa teškoćama u identifikaciji, proceni i izveštavanju o održivim aktivnostima na dosledan način. Ova nedoslednost može rezultirati fragmentiranim naporima, smanjujući ukupni uticaj inicijativa održivog finansiranja. Zainteresovane strane nemaju jasne standarde za izveštavanje, što otežava merenje napretka i osiguranje usklađenosti sa međunarodnim standardima održivosti. Ovo ograničava sposobnost kreatora politika da efikasno sprovede prakse održivog finansiranja.

Ograničeni tehnički kapacitet i stručnost

Ograničeni tehnički kapacitet i stručnost među zainteresovanim stranama na ZB značajno otežavaju efikasnu primenu i usklađenost sa principima održivog finansiranja. Mnoge finansijske institucije nemaju specijalizovano znanje i veštine potrebne za razumevanje i primenu složenih okvira održivog finansiranja, kao što je EU taksonomija. Ovaj jaz u stručnosti dovodi do nesigurnosti i konfuzije o tome kako integrisati ESG kriterijume u svoje operacije i procese donošenja odluka. Programi obuke i obrazovne inicijative o održivom finansiranju još uvek nisu široko rasprostranjeni u regionu, što dovodi do nedostatka profesionalaca koji mogu da vode finansijske institucije u prihvatanju ovih principa. Bez adekvatne obuke, osoblje u finansijskim institucijama može se suočiti sa poteškoćama u proceni zelenih projekata, izveštavanju o merilima održivosti i razumevanju regulatornih zahteva. Pored toga, finansijske institucije se često suočavaju sa poteškoćama u pristupu visokokvalitetnim ESG podacima koji su neophodni za procenu i upravljanje rizicima. U odsustvu pouzdanih podataka i standardizovanih mehanizama za izveštavanje, postaje izazovno za finansijske institucije da donesu informisane odluke i usklade se sa međunarodnim standardima. Ovaj nedostatak podataka dodatno otežava integraciju praksi održivog finansiranja.

Mala veličina tržišta

Relativno mala veličina tržišta na ZB ograničava obim i uticaj inicijativa održivog finansiranja. Na manjem tržištu, potencijal za velika ulaganja u zelene projekte je smanjen, što otežava postizanje značajnih ekoloških i ekonomskih koristi. Ovo ograničenje utiče na sposobnost finansijskih institucija da razviju i ponude širok spektar proizvoda održivog finansiranja, jer često nema dovoljno potražnje da bi se opravdali troškovi povezani sa kreiranjem i upravljanjem ovim proizvodima. Manja tržišta se takođe bore da privuku međunarodne investitore, koji su ključni za rast i razvoj održivog finansiranja. Investitori obično traže prilike u većim, razvijenijim tržištima, gde je potencijal za povrat veći. Ovaj nedostatak interesa od strane međunarodnih investitora dodatno ograničava dostupnost kapitala za zelene projekte, ometajući njihovu realizaciju i skaliranje. Mala veličina tržišta takođe znači manje resursa dostupnih za izgradnju kapaciteta i tehničku podršku. Finansijske institucije i regulatori mogu imati poteškoća da izdvoje neophodna sredstva i osoblje za razvoj stručnosti u održivom finansiranju, što dovodi do sporijeg usvajanja i integracije održivih praksi.

Potreba za većom saradnjom i regionalnom kooperacijom

Zainteresovane strane razumeju da je deljenje znanja i iskustava važno za razvoj okvira održivog finansiranja. Radom zajedno, zemlje ZB mogu učiti iz međusobnih uspeha i izazova, izbegavajući greške koje dolaze iz rada u izolaciji. Zajedničke radionice, seminari i programi obuke mogu pomoći finansijskim institucijama i donosiocima politika da bolje razumeju i prate principe održivog finansiranja. Koordinisane politike mogu osigurati da su regulative za održivo finansiranje slične širom regiona, smanjujući razlike koje mogu izazvati konfuziju.

Inicijativa CRM pokazuje značaj jedinstvenog pristupa ekonomskom razvoju i regulatornoj usklađenosti. Ako zemlje razvijaju svoje taksonomije bez regionalne saradnje, to bi moglo dovesti do fragmentisanog regulatornog okvira. Ova fragmentacija bi otežala finansijskim institucijama i kompanijama da posluju u različitim zemljama. Takođe bi stvorila nedoslednosti u načinu na koji se klasifikuju i izveštavaju održive aktivnosti, smanjujući efikasnost inicijativa održivog finansiranja. Bez regionalne saradnje, postoji i rizik od dupliranja napora i rasipanja dragocenih resursa. Pored toga, razvijanje taksonomija bez zajedničkog rada moglo bi povećati razlike u praksama i sposobnostima održivog finansiranja. Zemlje sa naprednijim okvirima mogle bi brže napredovati, ostavljajući druge iza. Ovaj neujednačen razvoj mogao bi oslabiti regionalno jedinstvo i napore ka ekonomskoj integraciji, usporavajući ukupnu tranziciju ka održivom finansiranju na ZB.

Razvoj regionalnog okvira taksonomije

Regionalni okvir taksonomije može harmonizovati napore, unaprediti usklađenost sa međunarodnim standardima i olakšati zelenu tranziciju u regionu. Ovaj deo istražuje ključne korake i razmatranja u razvoju regionalnog okvira taksonomije za ZB, obraćajući pažnju na uobičajene izazove, oslanjanje na regionalne snage i predlaganje strateških akcija za podsticanje jedinstvenog pristupa održivom finansiranju. Regionalni okvir taksonomije je ključan iz nekoliko razloga:

1. Zajednički okvir osigurava da sve zemlje u regionu rade ka istim ciljevima, smanjujući fragmentaciju i nedoslednosti u praksama održivog finansiranja.
2. Usklađivanjem sa EU taksonomijom i drugim globalnim standardima, ZB može privući međunarodne investicije i integrisati se lakše u šire evropske i globalne finansijske sisteme.
3. Regionalni pristup omogućava udruživanje resursa, znanja i stručnosti, omogućavajući efikasniju i skalabilniju implementaciju inicijativa održivog finansiranja.
4. Jedinstven okvir povećava kredibilitet i transparentnost aktivnosti održivog finansiranja, čineći region atraktivnijim za investitore i zainteresovane strane

Korak 1 – Osnivanje Regionalnog koordinacionog tela (RCB)

Ključni korak u razvoju regionalnog okvira taksonomije je osnivanje Regionalnog koordinacionog tela (RCB). Ovo telo bi koordinisalo napore širom ZB, osiguravajući doslednost i usklađenost sa međunarodnim

standardima. RCB bi sinhronizovao inicijative održivog finansiranja, razvijao i širio zajedničke smernice, metodologije i standarde, te nudio obuke i resurse za unapređenje tehničkih kapaciteta zainteresovanih strana. Pored toga, pratilo bi napredak u implementaciji održivog finansiranja i ocenjivalo efikasnost politika i inicijativa, zalažući se za podršku politikama i regulativama na regionalnom i međunarodnom nivou.

Korak 2 – Usklađivanje sa relevantnim ciljevima održivosti

Glavni cilj taksonomije (zelene ili održive) je doprinos širem cilju ili skupu ciljeva u oblasti održivog razvoja. U praksi, pristupi se razlikuju širom sveta. Dok se neke taksonomije fokusiraju samo na ekološke ciljeve, druge se fokusiraju i na društvene ciljeve. Na primer, EU taksonomija je prvenstveno fokusirana na ublažavanje klimatskih promena i adaptaciju, ali takođe integriše i druge aspekte (voda, vazduh, otpad itd.). Međutim, društveni deo u EU taksonomiji još uvek nije u potpunosti regulisan. S druge strane, Gruzijaska taksonomija održivog finansiranja ima dve komponente, zelenu i društvenu taksonomiju. Pojednostavljeno rečeno, svaka taksonomija treba biti prilagođena lokalnim okolnostima i doprinositi ciljevima kojima je namenjena. Na ZB postoji dokazano iskustvo studija i strategija vezanih za klimatske promene, a sve zemlje ZB (osim Kosova), razvile su i usvojile Nacionalno utvrđene doprinose (NDC) u skladu sa Pariskim sporazumom. Za ZB se preporučuje da se inicijalno fokusiraju na NDC-ove, jer deluju kao logična početna tačka. Prioritetizacijom NDC-ova, ZB može osigurati da njihova taksonomija podržava lokalne agende održivosti, dok je usklađena sa globalnim klimatskim ciljevima.

Tabela 1 - Nacionalno utvrđeni doprinosi (UNFCCC, 2024)

Zemlja	NDC (2030)
Albanija	20,9% u odnosu na BAU
Bosna i Hercegovina	12,8% u odnosu na 2014. god. (tj. 33,2% u odnosu na 1990. god.) – bezuslovni scenarij
Kosovo*	Nije potpisnica UNFCCC-a
Crna Gora	35% u odnosu na 1990. god.
Severna Makedonija	51% u odnosu na 1990. god.
Srbija	13,2% u odnosu na 2010. god. (tj. 33,3% u odnosu na 1990. god.)

Fokusiranje na NDC olakšaće koherentan pristup među zemljama ZB-a, poboljšavajući regionalnu saradnju i omogućavajući jedinstven odgovor.

Korak 3 – Fokus na sektore sa najvećim uticajem na definisane ciljeve

Identifikacija i fokusiranje na sektore sa najznačajnijim uticajem na ciljeve održivosti je ključno za efikasnost taksonomije. Ključni sektori koji bi trebalo da budu prioritet uključuju energetiku, transport, zgrade, industriju, poljoprivredu i šumarstvo. Energetski sektor je kritičan za ublažavanje klimatskih promena, sa naglaskom na OIE, EE i tranziciju sa fosilnih goriva. Inicijative za održivi transport, kao što su električna vozila i infrastruktura javnog prevoza, treba promovisati kako bi se smanjile emisije gasova sa efektom staklene bašte. Energetski

efikasne građevinske prakse i održive metode gradnje treba naglasiti, dok bi industrijski sektor trebalo da promoviše čistije proizvodne procese i upotrebu održivih materijala. Održive poljoprivredne prakse i upravljanje šumama treba uključiti kako bi se podržali biodiverzitet i ekosistemske usluge.

Korak 4 – Akcioni plan za okvir taksonomije

Razvoj sveobuhvatnog akcionog plana je ključan za uspešnu implementaciju regionalnog okvira taksonomije. Akcioni plan treba da definiše konkretne korake, vremenske rokove i odgovornosti za svaku fazu razvojnog procesa. Ključne komponente akcionog plana uključuju angažovanje zainteresovanih strana i konsultacije, izradu konceptualnog okvira, javne konsultacije i povratne informacije, finalizaciju i odobrenje, implementaciju, izgradnju kapaciteta, te monitoring i evaluaciju.

Angažovanje zainteresovanih strana od početka je presudno za osiguranje podrške. RCB bi trebalo da sprovede konsultacije sa ključnim akterima, uključujući državne agencije, finansijske institucije, predstavnike industrije i organizacije civilnog društva. Na osnovu inputa zainteresovanih strana, RCB bi trebalo da izradi konceptualni okvir koji definiše ključne elemente taksonomije. Ovaj okvir treba da definiše kriterijume za klasifikaciju održivih aktivnosti i uspostavi smernice za izveštavanje i obelodanjivanje.

Korak 5 – Izrada konceptualnog okvira

Och navodi da je EU taksonomija ključna za standardizaciju održivog finansiranja i pruža okvir zasnovan na naučnim osnovama. Međutim, Ronse upozorava da bi učinak regulative mogao biti ograničen zbog obimnih zahteva za izveštavanjem, ograničenog obuhvata i visokih troškova podataka, što bi moglo obeshrabrati učesnike. Da bi se poboljšala efikasnost taksonomije, ona preporučuje proširenje taksonomije uvođenjem „žutih“ i „crvenih“ kategorija, s ciljem da održivo finansiranje postane uobičajeno i podrži ambiciozne ekološke ciljeve EU (Och, 2020). ZB bi trebalo da prati princip „Prilagodi i usvoji“ (engl. Adapt and Adopt) za svoj okvir taksonomije, prilagođavajući EU taksonomiju, kako bi odgovarala njihovim jedinstvenim ekonomskim i infrastrukturnim kontekstima. Ovaj pristup osigurava da okvir bude relevantan i praktičan za ZB.

S obzirom na ograničene kapacitete u veštinama i dostupnosti podataka u regionu, preporučuje se fazna implementacija taksonomija održivog finansiranja. U početku, ZB bi trebalo da koristi pristup „belih lista“, gde se navode specifične ekonomske aktivnosti koje se smatraju održivim. Ovaj metod je jednostavniji i manje resursno intenzivan od razvijanja sveobuhvatnih tehničkih kriterijuma (TSC). Kako se kapaciteti zainteresovanih strana budu poboljšavali, taksonomija može postepeno uključivati detaljnije kriterijume i bliže se uskladiti sa pristupom EU, na kraju postižući potpunu usklađenost u roku od 2-3 godine. Ključni principi treba da vode razvoj regionalnog okvira taksonomije kako bi se osigurala efikasnost, praktičnost i usklađenost sa lokalnim i međunarodnim standardima:

- Taksonomija mora biti interoperabilna sa globalnim standardima, kao što je EU taksonomija, koristeći zajedničke metodologije, principe dizajna i strukture. Korišćenje međunarodno priznatih industrijskih klasifikacionih sistema, kao što je ISIC, olakšaće prekogranični tok kapitala i osigurati međunarodnu uporedivost.

- ZB bi trebalo da uči od postojećih taksonomija i smernica, kao što su one iz Južne Afrike, Kolumbije i Mongolije. Ovaj pristup štedi vreme i resurse oslanjanjem na dokazane metodologije i najbolje prakse.
- Taksonomija treba da dopunjuje postojeće i planirane politike i regulative održivog finansiranja, kao što su zelene obveznice, zeleni krediti i zahtevi za korporativno izveštavanje. Ovaj holistički pristup poboljšaće prihvatanje i implementaciju.
- Taksonomija treba da bude jasna, jednostavna i laka za implementaciju, sa transparentnim i lako razumljivim kriterijumima. Ova jednostavnost će pomoći korisnicima da se lakše snalaze u taksonomiji i smanjiti regulatorni teret, čineći je dostupnijom širokom spektru zainteresovanih strana.

Korak 6 – Javne konsultacije i objavljivanje okvira

Angažovanje širokog spektra zainteresovanih strana, uključujući državne agencije, finansijske institucije, predstavnike industrije (uključujući komore trgovine i privrede), akademsku zajednicu, civilno društvo i javnost, osigurava da okvir bude sveobuhvatan, praktičan i široko prihvaćen. Proces konsultacija treba da obuhvati više faza, počevši od početnih nacрта, omogućavajući povratne informacije i unapređenje kroz više iteracija. Ovaj participativni pristup pomaže u identifikaciji potencijalnih izazova, prikupljanju različitih perspektiva i izgradnji konsenzusa oko ciljeva i metodologija. Javni konsultacije se mogu sprovoditi kroz radionice, seminare, online ankete i javne forume.

Kada faza javnih konsultacija bude završena i povratne informacije budu inkorporirane, okvir treba finalizovati i pripremiti za objavljivanje. Objavljivanje okvira podrazumeva njegovo javno dostupnost putem zvaničnih kanala. Jasna komunikacija ciljeva, koristi i procedura primene okvira olakšaće njegovo usvajanje i upotrebu. Pored toga, pokretanje kampanja podizanja svesti i održavanje informativnih sesija može pomoći u promociji taksonomije i obrazovanju zainteresovanih strana o njenom značaju i operativnim aspektima. Ove aktivnosti će povećati transparentnost i poverenje i osigurati da se taksonomija efikasno integriše u prakse održivog finansiranja u regionu.

Korak 7 – Angažovanje zemalja ZB-a za izradu njihovih taksonomija

Angažovanje zemalja ZB-a za izradu njihovih taksonomija je ključan korak u uspostavljanju koherentnog i efikasnog regionalnog okvira taksonomije. Ovaj proces treba da bude vođen skupom opštih preporuka kako bi se osigurao strukturisan i inkluzivan pristup, koristeći principe i najbolje prakse navedene u raznim međunarodnim smernicama.

Prva faza u razvoju okvira taksonomije uključuje identifikaciju i imenovanje vodeće institucije, kao što je ministarstvo ili centralna banka, koja će nadgledati proces. Ova institucija će koordinisati napore, upravljati angažovanjem zainteresovanih strana i osigurati usklađenost sa regionalnim okvirom. S obzirom na složene administrativne strukture i političku nestabilnost u nekim zemljama ZB, odlučna uloga visoko pozicionirane institucije je od suštinskog značaja. Detaljan vremenski plan za proces razvoja taksonomije treba biti kreiran, uključujući ključne rokove. Pored toga, mora se formulisati sveobuhvatan plan angažovanja zainteresovanih strana, identifikujući sve relevantne aktere, uključujući državne agencije, finansijske institucije, predstavnike industrije, akademsku zajednicu i civilno društvo. Redovne konsultacije, radionice i sesije za povratne informacije osiguraće široko učešće i podršku.

Sledeća faza uključuje jasno definisanje ciljeva taksonomije, usklađivanje sa ciljevima održivosti i međunarodnim standardima kao što su Pariski sporazum i Ciljevi održivog razvoja. Opsežno istraživanje i benchmarking prema postojećim taksonomijama, poput EU taksonomije, pružiće dragocene uvide u najbolje prakse i pomoći u prilagođavanju taksonomije specifičnom kontekstu svake ekonomije ZB. Treba razviti nacrt taksonomije, uključujući klasifikaciju ekonomskih aktivnosti, kriterijume održivosti i metodologije za ocenjivanje. Ovaj nacrt mora biti detaljan, ali fleksibilan, kako bi se uključile povratne informacije zainteresovanih strana. Pilot faza će zatim testirati nacrt taksonomije u odabranim sektorima ili projektima, prikupljajući praktične uvide i identifikujući potencijalne probleme za unapređenje.

Na osnovu povratnih informacija iz pilot faze i javnih konsultacija, nacrt taksonomije će biti doraden i finalizovan. Konačna verzija će biti objavljena zajedno sa sveobuhvatnim smernicama i objašnjenjima kako bi se osiguralo jasno razumevanje i primena. Programi izgradnje kapaciteta biće razvijeni i pruženi organizacijama koje će implementirati taksonomiju. To uključuje obuke, radionice i pružanje resursa i alata za unapređenje tehničkih sposobnosti. Može se uspostaviti okvir za monitoring, evaluaciju i učenje (MEL) kako bi se pratila implementacija i efikasnost taksonomije, uključujući ključne pokazatelje uspeha (KPI), metode prikupljanja podataka i redovne rasporede izveštavanja kako bi se osigurala stalna poboljšanja.

Korak 8 – Praćenje i ažuriranje taksonomije

Redovno praćenje i ažuriranje taksonomije je od suštinskog značaja za osiguranje njene dugoročne efikasnosti, relevantnosti i usklađenosti sa razvojem ciljeva održivosti i tržišnih uslova. Ovaj proces podrazumeva uspostavljanje rasporeda za godišnje preglede kako bi se procenila performansa taksonomije u odnosu na definisane ciljeve, koristeći ključne indikatore uspeha, kao što su broj zelenih investicija, broj usklađenih projekata i smanjenja emisije gasova sa efektom staklene bašte. Prikupljanje i analiza podataka su ključni, a organizacije i finansijske institucije će biti u obavezi da redovno izveštavaju o svojoj usklađenosti sa taksonomijom. Angažovanje zainteresovanih strana kroz stalni dijalog sa državnim agencijama, finansijskim institucijama, predstavnicima industrije i civilnim društvom je vitalno za prikupljanje uvida i predloga za poboljšanja. Kontinuirane obuke i tehnička pomoć, uključujući radionice, seminare i online resurse, podržaće zainteresovane strane u efikasnoj primeni ažurirane taksonomije. Transparentnost se održava kroz javno izveštavanje o nalazima iz pregleda i ažuriranja, detaljišući performanse, promene i razloge za te promene. Pored toga, taksonomija treba da bude ažurirana najnovijim naučnim istraživanjima i tehnološkim napretkom, integrišući nova saznanja kako bi ostala efikasna i odgovorna na tržišne uslove i nove izazove u održivosti, širenjem obuhvata na nove sektore ili preciziranjem tehničkih kriterijuma.

Zaključak i preporuke

Članak ističe i napredak i izazove sa kojima se zemlje ZB-a suočavaju u usklađivanju sa principima održivog finansiranja i EU taksonomijom. Uprkos nekim naprecima, značajne prepreke i dalje ometaju punu primenu i usvajanje praksi održivog finansiranja.

Finansijsko tržište, kojim dominiraju banke, zajedno sa visokim nivoima stranog vlasništva, olakšao je usvajanje modernih poslovnih modela, ali je takođe postavio izazove u usklađivanju sa ciljevima održivog finansiranja. Članak identifikuje nekoliko ključnih oblasti koje je potrebno adresirati kako bi se podstakao ekosistem održivog finansiranja na ZB. To uključuje razvoj zajedničkog regionalnog

okvira taksonomije, izgradnju kapaciteta, zagovaranje i unapređenu regionalnu saradnju. Uspostavljanje regionalnog koordinacionog tela ključno je za harmonizaciju napora i osiguranje usklađenosti sa EU taksonomijom i međunarodnim standardima. Ovo telo bi imalo ključnu ulogu u razvoju smernica, pružanju obuka i promociji održivog finansiranja širom regiona.

Jedna od glavnih preporuka je usklađivanje sa relevantnim ciljevima održivosti, posebno sa NDC-ovima kao početnom tačkom. Ovaj fokus pomoći će usmeravanju investicija ka projektima koji direktno doprinose klimatskim ciljevima i promovišu obnovljive izvore energije, energetske efikasnost, održivu poljoprivredu i klimatski otpornu infrastrukturu. Takođe, prioritetizacija sektora sa najznačajnijim uticajem na ciljeve održivosti je od suštinskog značaja.

Razvoj regionalnog okvira taksonomije treba da prati princip „Prilagodi i usvoji“ (engl. Adapt and Adopt), umesto direktnog kopiranja EU taksonomije. Ovaj pristup osigurava da je okvir prilagođen jedinstvenom ekonomskom i infrastrukturnom kontekstu Zapadnog Balkana. Početak sa pristupom „belih lista“ u početnim fazama može pojednostaviti proces implementacije i postepeno uključiti detaljnije kriterijume kako se kapaciteti među zainteresovanim stranama budu poboljšavali. Praćenje i ažuriranje taksonomije je kritičan proces koji mora biti kontinuiran. Uspostavljanje redovnih ciklusa pregleda, angažovanje sa zainteresovanim stranama i prilagođavanje taksonomije na osnovu novih naučnih podataka i tehnoloških napredaka su ključni koraci. Kontinuirane obuke i tehnička pomoć za zainteresovane strane pomoći će da taksonomija ostane efikasna i relevantna.

Javne konsultacije i angažovanje zainteresovanih strana su ključni za uspešan razvoj i implementaciju taksonomije. Redovne konsultacije, radionice i mehanizmi za povratne informacije osiguravaju da je taksonomija sveobuhvatna, praktična i široko prihvaćena. Transparentnost i jasna komunikacija o ciljevima, koristima i procedurama primene taksonomije olakšaće njeno usvajanje i upotrebu. Članak naglašava važnost koordinisanog regionalnog pristupa održivom finansiranju, oslanjajući se na inicijative poput CRM-a. Harmonizovanjem napora, izbegavanjem fragmentisanih regulatornih okvira i standardizacijom klasifikacija i izveštavanja o održivom finansiranju, zemlje ZB mogu poboljšati regionalnu saradnju i privući međunarodne investicije.

Literatura

1. Sredojević, Slađana i Sredojević, Dragoslava. Sustainable Finance – Evolution or Revolution in the Banking Sector. Banking. 2021, T. 50.
2. EBRD. Can the Western Balkans converge towards EU living standards? London : European Bank for Reconstruction and Development, 2024.
3. Limani, Vjollca. Quo vadis sustainable finance? Drivers and barriers to green finance trends in the Western Balkans. Economic Vision: International Scientific Journal in Economics,. 2024, T. 11, str. 120-133.
4. Green Finance for Sustainable Development in the Western Balkans. Mulita, Rers. 2023, 9th International Scientific Conference ERAZ 2023.
5. European Comission. European Comission. Questions and Answers on the Sustainable Finance package. [Na mreži] 75 2024. https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_3194.
6. SBFN. SBFN Toolkit - Sustainable Finance Taxonomies. s.l. : IFC & SBFN, 2024.
7. Schützea, Franziska i Stede, Jan. The EU sustainable finance taxonomy and its contribution to climate neutrality. Journal of Sustainable Finance & Investment. 2024, T. 14, 1, str. 128-160.

8. BoA. Strategy - Roadmap for the management and supervision of climate-related financial risks in the financial sector. Tirana : Bank of Albania, 2023.
9. AFSA. STRATEGY OF THE ALBANIAN FINANCIAL SUPERVISORY AUTHORITY 2023-2027. s.l. : Albanian Financial Supervisory Authority, 2023.
10. CBBH. Strategic plan of the Central Bank of Bosnia and Herzegovina. Sarajevo : Central Bank of Bosnia and Herzegovina, 2022.
11. Suljić, Vedad. The analysis of existing green financial products in Bosnia and Herzegovina . Sarajevo: UNDP, 2021.
12. FBA. Management and Supervision of Risks Related to Climate Change and the Environment in the Banking Sector. Sarajevo : Federal Banking Agency, 2023.
13. BARS. Guidelines for managing risks associated with climate change and environmental risks. Banja Luka : Banking Agency of Republika Srpska, 2023.
14. FinSAC. Annual Report 2023. Washington DC : The World Bank, 2024.
15. IMF. IMF Country Report No. 23/372. 2023.
16. MSDT Mne. National Strategy for sustainable development of Montenegro. Podgorica : Ministry of sustainable development and tourism of Montenegro, 2016.
17. CBCG. Annual Report on Operations 2022. Podgorica : Central Bank of Montenegro, 2023.
18. NBRM. Climate Risks – Results from the Survey conducted in banks and savings houses in the Republic of North Macedonia. Skopje : National Bank of the Republic of North Macedonia, 2022.
19. European Commission. North Macedonia 2023 Report. Brussels : European Commission, 2023.
20. NBRM. Report on the risks in the banking system of the Republic of North Macedonia in the third quarter of 2023. Skopje : National Bank of the Republic of North Macedonia, 2023.
21. MoF Serbia. Sustainable finance framwrok for Republic of Serbia. Belgrade : Ministry of Finance of Serbia, 2024.
22. UNDP. Serbia Green Bond Reporting. Belgrade : UNDP, 2022.
23. UNFCCC. United Nations Framewrok Convention on Climate Change. NDC Registry. [Na mreži] 12 6 2024. <https://unfccc.int/NDCREG>.
24. Och, Marleen. Sustainable Finance and the EU Taxonomy Regulation – Hype or Hope? Jan Ronse Institute - Working Paper No. 2020/05. 2020.

Received: 10.09.2024.

Accepted: 17.10.2024.

DOI: 10.5937/bankarstvo2403086S

IMPORTANCE OF THE DEVELOPMENT OF A REGIONAL FRAMEWORK FOR SUSTAINABLE FINANCE TAXONOMIES

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Summary: This article explores the importance of developing a regional framework for sustainable finance taxonomies in the Western Balkans. By fostering a coordinated approach, the Western Balkans can enhance alignment with the EU Taxonomy, attract international investments and drive their green transition efforts more effectively. The article discusses the current uptake of sustainable finance in the Western Balkans, identifies common challenges and barriers and outlines a detailed roadmap for developing a regional taxonomy framework. Key recommendations include establishing a regional coordination body, aligning with sustainability goals like the Nationally Determined Contributions, focusing on high-impact sectors and adopting a phased implementation approach. A phased implementation approach is recommended, starting with a whitelist of specific sustainable activities and gradually incorporating more detailed criteria as stakeholder capacities improve. The article underscores the potential of a unified taxonomy to enhance regional cooperation, attract international investment and foster sustainable economic development in the WB6. It emphasizes the need for continuous monitoring, stakeholder engagement and capacity building to ensure the framework's effectiveness and relevance.

Key words: ESG, EU taxonomy, sustainable finance, sustainable finance taxonomy, Western Balkans.

JEL classification: F55, G18, G28, Q56

Introduction

Sustainable finance is, increasingly more often, recognized as a key factor in tackling global environmental issues and enhancing economic resilience. It involves financial activities that integrate environmental, social and governance (ESG) criteria to promote sustainable development over the long term. A fundamental component in the realm of sustainable finance is the taxonomy, offering a systematic method for identifying and evaluating environmentally sustainable economic activities.

The financial sectors in the Western Balkans (WB6) are predominantly composed of banks, mostly accounting for 80-90% of the total financial assets, with Kosovo^{1*} being an exception at 68% in 2020 due to its notable and expanding private pension-fund sector. Other financial intermediaries, such as insurance companies, pension and investment funds and stock exchanges, play a relatively minor role in the region's financing landscape. A significant number of these banks are owned by foreign, primarily EU-based, parent banks. This foreign ownership has facilitated the adoption of modern business models and advanced information and communication technology (ICT) systems but also led to excessive leveraging prior to the global financial crisis, as evidenced by high loan-to-deposit ratios. The Vienna Initiative, launched in 2009 by the European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), European Commission (EC), International Monetary Fund (IMF) and the World Bank (WB), played a crucial role in preventing chaotic deleveraging by parent banks in WB6, thereby maintaining financial stability post-crisis. Currently, commercial banks in WB6 maintain healthy capitalization and liquidity ratios, primarily supported by their deposit bases. Despite these advancements, banking sector penetration remains relatively low. Financial sector depth, typically measured by total assets or private-sector credit relative to GDP, is usually positively correlated with economic development, though excessive levels can lead to crises. The WB6 banking sector assets average below 100% of GDP, lower than the eurozone average of 280% of GDP in 2021 (EBRD, 2024).

Sustainable finance is transforming the banking sector by integrating green policies into all operations, with major financial institutions, like the European Investment Bank and European Bank for Reconstruction and Development, committing to "going green" across all funding. Banks are shifting focus from merely what they finance to how they finance, with strategic goals to reduce emissions, support responsible investments, and integrate ESG into core banking activities. The proactive involvement of global banks in sustainable initiatives—such as Deutsche Bank's targets and the European Banking Federation's collaboration on the EU Taxonomy—demonstrates a shift toward a fully sustainable finance approach, influencing investor preferences toward environmentally friendly options (Sredojević & Sredojević, 2021).

The WB6 is making efforts to integrate sustainable finance principles into their financial systems. However, the region faces various challenges, such as the lack of standardized frameworks, limited technical capacity and small market size. Aligning with the European Union (EU) Taxonomy, a detailed classification system designed to guide sustainable investments, presents both opportunities and challenges for these countries.

¹ All references to Kosovo, whether the territory, institutions or population, in this text shall be understood in full compliance with United Nations' Security Council Resolution 1244 and without prejudice to the status of Kosovo.

In her study on green finance in the Western Balkans, Limani finds that while WB countries have made efforts to adopt green finance strategies and align with international agreements, such as the Kyoto Protocol and Paris Agreement, they remain in the early stages of developing sustainable economies. Despite receiving EU and international funding, challenges persist due to inadequate institutional preparation, lack of skilled personnel, and compliance issues, leading to bureaucratic and legal obstacles that hinder green transformation. Limani emphasizes the need for further investigation into these barriers to provide actionable recommendations for advancing green finance in the region (Limani, 2024).

Mulita explores how green finance supports sustainable development in the Western Balkans by facilitating investments in renewable energy, sustainable infrastructure, and inclusive growth, with the EU and international financial institutions playing a pivotal role. Although sustainable finance is gaining traction in the region, challenges such as limited access to finance, lack of awareness, and regulatory gaps persist, necessitating further policy interventions, legislative improvements, and fiscal incentives to advance green finance and achieve sustainability goals (Mulita, 2023).

The EU Taxonomy for sustainable activities (EU taxonomy) defines environmentally sustainable economic activities, helping investors and companies understand what qualifies as sustainable. This classification system provides businesses and investors with a common language, ensuring investments contribute substantially to at least one of six environmental objectives: climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control and protection and restoration of biodiversity and ecosystems (European Commission, 2024). As of April 2024, there are 47 sustainable finance taxonomies (from simple to more complex). Currently, three-quarters of advanced economies are now covered by an economy-level or regional sustainable finance taxonomy, just over 10% of emerging markets and developing economies are covered (SBFN, 2024).

Schütze and Stede highlight that the EU Taxonomy aims to direct investments towards low-carbon activities by providing transparent, standardized environmental information. They find that while the taxonomy covers high-emission sectors, it does not fully incentivize breakthrough technologies for decarbonization and lacks pathways toward climate neutrality in some sectors (e.g., buildings, basic materials). They propose additional criteria, like a “brown taxonomy” for non-sustainable activities, to enhance investor guidance and prevent lock-in to carbon-intensive assets, suggesting adjustments to make it more comprehensive and supportive of long-term climate goals (Schütze & Stede, 2024).

This article is primarily derived from the project “Technical Assistance to Assess the Financial Landscape in the Western Balkans in Relation to Sustainable Finance Taxonomy Prospects” an initiative by the Regional Cooperation Council (RCC) under the Common Regional Market (CRM) Action Plan 2021–2024. This project aims to comprehensively assess the sustainable finance landscape in the WB6 and develop recommendations for a sustainable finance taxonomy framework that aligns with EU regulations and international standards.

The objective of this article is to highlight the significance of creating a regional framework for sustainable finance taxonomies in the WB6. By promoting a coordinated approach, the WB6 can improve their alignment with the EU Taxonomy, attract international investments and effectively advance their green transition efforts. The following sections will provide an analysis of the current state of sustainable finance in the WB6, discuss the common challenges faced by the region and outline a roadmap for developing a regional taxonomy framework that adheres to international standards. This comprehensive examination aims to offer valuable insights and practical guidance for policymakers, financial institutions and other stakeholders in the WB6.

Landscape of Sustainable Finance in the Western Balkans

Sustainable finance has gained momentum globally, driven by regulatory initiatives, voluntary guidelines and market-driven standards. The United Nations' Principles for Responsible Investment (PRI) encourage investors to incorporate ESG considerations in their decision-making processes. The Task Force on Climate-related Financial Disclosures (TCFD) provides recommendations for companies on climate-related financial disclosures, promoting transparency and accountability. Additionally, the Equator Principles offer guidelines for managing environmental and social risks in project finance. The EU Taxonomy stands as a significant regulatory framework, guiding companies in identifying and reporting on environmentally sustainable activities. These frameworks collectively aim to channel capital towards sustainable investments, enhance transparency and support global climate goals.

In **Albania**, the UN Joint Programme 'Strategic Policy Options for SDG Financing' aims to support financing related to United Nations Sustainable Development Goals (SDGs). Since July 2017, the Bank of Albania (BoA) has been part of the "Global Sustainable Development Resolution", highlighting the importance of the financial sector in fulfilling the Principles of the UN SDGs and the projects of the Paris Agreement (COP21). In December 2020, the BoA joined the Central Banks and Supervisory Networks for Greening the Financial System (NGFS), emphasizing the "green" content (BoA, 2023). The BoA has established a high-level working group dedicated to sustainable finance and has developed a medium-term green finance strategy in collaboration with the WB. This strategy includes managing climate risks within the banking sector and developing a green dashboard to bridge data gaps related to climate finance. The Albanian Financial Supervisory Authority (AFSA), pursuant to the action plan for sustainable finance, in line with EU practices (i.e. EU Green Bond Standard), aims to establish a standard for green bonds issuance (AFSA, 2023).

Financial institutions in Albania are starting to classify green activities primarily based on the BoA's guidelines and the green dashboard. The focus is on energy efficiency (EE) and renewable energy sources (RES), with larger banks having more advanced systems due to their affiliation with EU-based parent companies. Green loans and green bonds are being introduced, although their market penetration remains limited. The BoA plans to implement sustainability indicators via the NGFS Green Dashboard to monitor financial stability, conduct regular corporate surveys on green practices, issue principle-based climate risk guidelines for supervisory discussions and hold frequent roundtables with licensed institutions to address green finance challenges and raise awareness (BoA, 2023).

Bosnia and Herzegovina (BiH) has seen a gradual uptake of sustainable finance, primarily driven by international organizations like the WB and the EBRD. The financial sector's green finance efforts are mainly directed at individuals and public institutions, focusing on EE measures. The Central Bank of Bosnia and Herzegovina (CBBH) has outlined strategic goals to enhance financial stability and inclusion, aligning indirectly with sustainable finance principles. The CBBH's strategic plan highlights the importance of aligning with EU and international standards to enhance the quality and timeliness of official statistics related to financial stability and economic developments (CBBH, 2022). However, the lack of a comprehensive regulatory framework and standardized methodologies for reporting and compliance remains a significant challenge. The green finance offerings remain modest, with commercial banks often adopting ESG policies due to group-level mandates (those with headquarters in the EU), resulting in a negligible share of green financial products (less than 2% in 2021 for the private sector). International Financing Institutions play a crucial role by financing the public sector through partner institutions, with limited direct investments in private companies (Suljić, 2021). In 2024, the CBBH applied for membership in the NGFS, and became a member in August 2024.

Efforts towards establishing a sustainable finance framework are fragmented and primarily driven by international organizations like the WB through educational seminars and the PULSAR (Public Sector Accounting and Reporting Program) program. Currently, there is limited coordination between the Ministry of Finance and Treasury (MFT) of BiH and entity-level financial bodies regarding sustainable finance projects. The Federal Banking Agency (FBA) and the Banking Agency of Republika Srpska (BARS) in Bosnia and Herzegovina are prioritizing climate and environmental risk management within the banking sector for 2023-2025. While the FBA supports green financing and encourages banks to develop taxonomies aligned with the EU Taxonomy, BARS focuses on integrating climate risk into risk management frameworks and recommends adopting international best practices for sustainable finance (FBA, 2023) (BARS, 2023).

In practice, financial institutions in BiH classify green activities based on internally developed guidelines, often influenced by their parent companies in the EU. The focus is on EE, RES and some social components, primarily through green loans. Compared to global best practices, financial institutions in BiH are in the early stages of adopting comprehensive sustainable finance frameworks, i.e. they are still developing basic frameworks and tools, indicating a substantial gap in comparison to advanced practices.

Kosovo* is making strides in sustainable finance, despite lacking advanced sustainable finance products like green bonds. The Central Bank of Kosovo* (CBK) has been proactive in encouraging financial institutions to incorporate ESG factors into their operations. The recent approval of the Law on Sustainable Investment aims to create a comprehensive legal framework for promoting sustainable investments. The CBK is also working on a Climate Risk Strategy to embed climate-related risks within the supervisory framework. WB's FinSAC has provided crucial technical assistance in Kosovo*, focusing on financial stability reforms and aligning with international standards. Key projects supported the CBK in green finance, bank resolution and risk-based supervision. Activities included developing a Climate Risk Strategy and enhancing climate-related risk management. Despite postponements due to CBK's structural changes, FinSAC's efforts have advanced Kosovo*'s regulatory frameworks, with more assistance expected in 2024 (FinSAC, 2024). The Resilience and Sustainability Facility (RSF) program supports the implementation of energy and climate reform agenda. RSF financing has expanded fiscal space to implement actions aimed at increasing the share of renewables and protecting vulnerable energy consumers (IMF, 2023).

However, challenges such as a lack of awareness and expertise, inadequate data availability and limited market size persist. The Kosovo* Banking Association (KBA) contributes to education on sustainable finance through various trainings and seminars. Financial institutions in Kosovo* classify green and sustainable activities based on preliminary strategies developed in collaboration with international organizations. These classifications primarily focus on EE and sustainable agriculture, with initiatives like the Kosovo* Credit Guarantee Fund supporting green projects. However, the lack of standardized classification methods results in varying approaches among different institutions.

Montenegro's commitment to sustainable finance is evident in its National Strategy for Sustainable Development by 2030, which emphasizes integrating environmental considerations into financial systems. By prioritizing green finance, Montenegro seeks to enhance its ecological footprint management and foster sustainable economic practices that align with the global goals of the UN 2030 Agenda for Sustainable Development (MSDT Mne, 2016). The Central Bank of Montenegro (CBCG) has adopted a policy to promote the green economy by integrating sustainability criteria into its policies and encouraging green financial products. The CBCG's Sustainable Finance Roadmap focuses on developing a taxonomy for sustainable activities and enhancing stakeholder engagement. Challenges include the need for capacity building and better coordination among institutions. Key institutions like the Ministry of Economy and the Ministry of Finance are working towards aligning with EU sustainable finance regulations.

The CBCG's 2022 Annual Report highlights progress in sustainable finance initiatives. The report emphasizes the importance of integrating international standards and best practices into the local financial system to enhance its resilience and sustainability. The CBCG has actively engaged in promoting ESG considerations within the banking sector, aligning with broader EU directives and international frameworks. In collaboration with international organizations like the International Monetary Fund (IMF) and the WB, Montenegro is working to build capacity and raise awareness among financial institutions regarding sustainable finance practices (CBCG, 2023).

In Montenegro, financial institutions classify green activities based on international guidelines and frameworks. The Investment and Development Fund of Montenegro offers credit lines for green financing, primarily targeting RES projects. While there is no official taxonomy yet, institutions rely on criteria set by international partners like the EBRD and the French Development Agency (AFD).

North Macedonia has made progress in aligning with EU regulations and guidelines for sustainable finance. The National Bank of the Republic of North Macedonia (NBRM) has issued guidelines for managing climate-related risks and is working on a comprehensive mid-term plan to embed climate risks into financial analyses. The Macedonian Stock Exchange has implemented voluntary ESG guidelines for listed companies. However, challenges such as the absence of a green taxonomy, lack of regulatory guidelines and inadequate data hinder the full adoption of sustainable finance practices. Collaboration with international organizations like the EBRD and the European Investment Bank (EIB) provides technical assistance and funding to support these efforts.

The survey of financial institutions in North Macedonia reveals that approximately 90% of financial institutions recognize climate change as a significant risk to financial stability, yet 87% of banks have not established internal climate risk management policies. Less than half of financial institutions have introduced new green financial products, primarily through partnerships with the EBRD. Major challenges include the absence of regulatory guidelines, lack of standards and tools and inadequate data. The survey underscores the need for more detailed regulatory frameworks and capacity building to align with EU standards and effectively manage climate risks (NBRM, 2022).

Financial institutions in North Macedonia classify green and sustainable activities based on a combination of international guidelines and local practices. The focus is on green loans and green bonds, supported by partnerships with the EBRD and other international organizations. The absence of a comprehensive taxonomy leads to fragmented classification systems, with institutions using different criteria based on their funding sources and regulatory requirements. As part of the NBRM's Strategy for the Management of Climate-Related Risks, North Macedonia adopted a Decision on the Methodology for Credit Risk Management in February 2023, according to which banks are expected to adequately incorporate the climate-related risks in their credit risk management from January 2025 (European Commission, 2023).

Despite significant growth, the share of green loans is at a very low level. Over the period 2019-2023, it increased from 2.2% to 4.5%. As of September 30, 2023, the share of green loans in the total loans to non-financial entities in North Macedonia was very low. Green loans specifically to non-financial entities accounted for 8.8%, while green loans to households represented a much smaller share, at only 0.5% of their total loans. Although green lending increased by 2.1% compared to December 31, 2022, its overall presence in the banks' loan portfolios remains limited (NBRM, 2023).

The document regarding **Serbia's** sustainable finance framework outlines the commitment of this economy to sustainable development, focusing on ESG policies. It details Serbia's strategies to achieve the UN

SDGs, support global decarbonization and promote social inclusion. The framework serves as a guide for issuing Green, Social and Sustainable Finance Instruments to raise funds from international capital markets (MoF Serbia, 2024). Serbia's commitment to sustainable finance is outlined in its Green Bond Framework, which supports the issuance of green bonds for various sectors, including RES and sustainable water management. In August 2021, the Government of Serbia adopted its first sovereign green bond framework, detailing the process for defining, selecting and reporting eligible green expenditures and envisioning a sustainable Serbian economy. A month later, Serbia issued its first green bond in international markets, raising EUR 1 billion with a 1% annual coupon rate (UNDP, 2022). The National Bank of Serbia (NBS) is developing guidelines for issuers of green bond and there are ongoing collaborations with UNDP to develop frameworks for these financial instruments.

The Law on Accounting mandates comprehensive financial and non-financial reporting standards, promoting ESG disclosure. Despite these initiatives, the integration of green financial products in Serbian banks' portfolios remains limited, constituting a small percentage of the total portfolio. Key barriers include a lack of expertise, inadequate data availability and varying levels of readiness among companies to adopt sustainable practices.

The integration of green financial products in Serbian banks' portfolios remains limited, with these products constituting approximately 5 to 10% of the total portfolio on average. Despite the growing emphasis on sustainability, green financing measures such as green loans and green bonds are still underrepresented. Financial institutions in Serbia classify green activities using methodologies developed in collaboration with international partners. The focus is on green bonds and green loans, with larger banks having more advanced classification systems due to their EU affiliations. The lack of a standardized approach results in varying practices across institutions, highlighting the need for a unified taxonomy.

Regional Challenges and Obstacles

The WB6 face numerous challenges and obstacles in adopting and integrating sustainable finance practices. These obstacles hinder the region's progress in aligning with international standards like the EU Taxonomy and realizing the full potential of sustainable finance. Here are the primary challenges and obstacles based on interviews with various stakeholders from the WB6 and a detailed analysis:

Lack of Awareness and Understanding

A general lack of awareness and understanding of sustainable finance principles among stakeholders in the WB6 presents a significant barrier to the effective adoption and implementation of sustainable finance practices. Many stakeholders are not fully informed about the benefits and requirements of sustainable finance. Without a clear understanding of sustainable finance principles, stakeholders may underestimate the potential long-term economic and environmental benefits, such as increased resilience to climate risks, enhanced reputation and access to new markets and funding opportunities.

Furthermore, insufficient knowledge about sustainable finance can lead to ineffective implementation of related initiatives. For instance, financial institutions struggle to develop and manage green financial products,

Misunderstanding of the EU Taxonomy

The absence of a taxonomy for sustainable finance in the WB6 presents a significant challenge for aligning with the EU Taxonomy. Without a taxonomy, financial institutions face inconsistencies in defining and reporting sustainable activities, leading to fragmented and often incompatible practices. This issue is further compounded by a general misunderstanding of the EU Taxonomy among local stakeholders, including financial institutions, corporations and regulatory bodies (ministries and central banks). Many, not all, perceive a green taxonomy only as a decision-making tool for investment approval—essentially a yes/no framework. While taxonomy indeed helps classify which activities are sustainable and which are not, this narrow view misses its broader purpose.

Lack of Strong Commitment and Push-Back from Stakeholders

There is a noticeable lack of strong commitment from key stakeholders, particularly from the ministries of finance and central banks in the WB6. The complexity and novelty of sustainable finance frameworks like the EU Taxonomy contribute to resistance and push-back. Stakeholders may be reluctant to commit to initiatives they do not fully understand or that could disrupt existing financial and regulatory systems. Additionally, the perceived burden of additional regulatory compliance and reporting requirements further deters stakeholders from embracing sustainable finance practices. Without clear leadership and coordination, efforts to adopt sustainable finance taxonomies are slow and disjointed.

Lack of Existing Frameworks

Currently, many financial institutions and regulatory bodies in the WB6 do not have established frameworks to guide sustainable finance activities. This absence of frameworks leads to several issues. It hampers the development of standardized procedures for assessing and managing ESG risks. Without clear regulations and methodologies, financial institutions and corporations struggle to identify, evaluate and report on sustainable activities consistently. This inconsistency can result in fragmented efforts, reducing the overall impact of sustainable finance initiatives. Stakeholders have no clear benchmarks or reporting standards to follow, making it difficult to measure progress and ensure compliance with international sustainability standards. This limits the ability of policymakers to enforce sustainable finance practices effectively.

Limited Technical Capacity and Expertise

Limited technical capacity and expertise among stakeholders in the WB6 significantly hinder the effective implementation and compliance with sustainable finance principles. Many financial institutions lack the specialized knowledge and skills needed to understand and apply complex sustainable finance frameworks, such as the EU Taxonomy. This gap in expertise results in uncertainty and confusion about how to integrate ESG criteria into their operations and decision-making processes. Training programs and educational initiatives on sustainable finance are not yet widespread in the region, leading to a shortage of professionals who can guide financial institutions in adopting these principles. Without adequate training, staff at financial institutions may struggle with tasks such as evaluating green projects, reporting on sustainability metrics and understanding regulatory requirements. Moreover, financial institutions often face difficulties accessing high-quality ESG

data necessary for assessing and managing risks. In the absence of reliable data and standardized reporting mechanisms, it becomes challenging for financial institutions to make informed decisions and comply with international standards. This data gap further complicates the integration of sustainable finance practices.

Small Market Size

The relatively small market size in the WB6 limits the scale and impact of sustainable finance initiatives. In a smaller market, the potential for large-scale investments in green projects is reduced, making it challenging to achieve significant environmental and economic benefits. This limitation affects the ability of financial institutions to develop and offer a wide range of sustainable finance products, as there is often insufficient demand to justify the costs associated with creating and managing these products. Smaller markets also struggle to attract international investors who are crucial for the growth and development of sustainable finance. Investors typically seek opportunities in larger, more established markets where the potential for returns is higher. This lack of interest from international investors further restricts the availability of capital for sustainable projects, hindering their implementation and scalability. The small market size also means fewer resources are available for capacity building and technical support. Financial institutions and regulators may find it difficult to allocate the necessary funds and personnel to develop expertise in sustainable finance, leading to slower adoption and integration of sustainable practices.

Need for Greater Collaboration and Regional Cooperation

Stakeholders understand that sharing knowledge and experiences is important for developing sustainable finance frameworks. By working together, WB6 countries can learn from each other's successes and challenges, avoiding mistakes that come from working alone. Joint workshops, seminars and training programs can help financial institutions and policymakers understand and follow sustainable finance principles better. Coordinated policies can ensure that sustainable finance regulations are similar across the region, reducing differences that can cause confusion.

The CRM initiative shows the importance of a unified approach to economic development and regulatory alignment. If countries develop their own taxonomies without regional cooperation, it could lead to a fragmented regulatory landscape. This fragmentation would make it harder for financial institutions and businesses to operate across different countries. It would also create inconsistencies in how sustainable activities are classified and reported, reducing the effectiveness of sustainable finance initiatives. Without regional collaboration, there is also a risk of duplicating efforts and wasting valuable resources. Additionally, developing taxonomies without working together could increase differences in sustainable finance practices and capabilities. Countries with more advanced frameworks might move ahead faster, leaving others behind. This uneven development could weaken regional unity and economic integration efforts, slowing down the overall transition to sustainable finance in the WB6.

Developing a Regional Taxonomy Framework

A regional taxonomy framework can harmonize efforts, enhance alignment with international standards and facilitate the green transition in the region. This section explores the critical steps and considerations in developing a regional taxonomy framework for the WB6, addressing common challenges, leveraging regional strengths and proposing strategic actions to foster a unified approach to sustainable finance. A regional taxonomy framework is essential for several reasons:

1. A common framework ensures that all countries in the region work towards the same goals, reducing fragmentation and inconsistencies in sustainable finance practices.
2. By aligning with the EU Taxonomy and other global benchmarks, the WB6 can attract international investments and integrate more seamlessly into the broader European and global financial systems.
3. A regional approach allows for the pooling of resources, knowledge and expertise, enabling more efficient and scalable implementation of sustainable finance initiatives.
4. A unified framework enhances the credibility and transparency of sustainable finance activities, making the region more attractive to investors and stakeholders.

Step 1 - Establishing a Regional Coordination Body (RCB)

A critical step in developing a regional taxonomy framework is establishing a Regional Coordination Body (RCB). This body would coordinate efforts across the WB6, ensuring consistency and alignment with international standards. The RCB would synchronize sustainable finance initiatives, develop and disseminate common guidelines, methodologies and standards and offer training and resources to enhance the technical capabilities of stakeholders. Furthermore, it would monitor the progress of sustainable finance implementation and assess the effectiveness of policies and initiatives, advocating for supportive policies and regulations at both the regional and international levels.

Step 2 – Alignment with Relevant Sustainability Goals

The principal aim of a taxonomy (green or sustainable) is to contribute to a broader goal or set of goals in the field of sustainable development. In practice, around the world, approaches differ. While some taxonomies focus only on environmental goals, others focus also on social goals. For instance, the EU taxonomy is primarily focused on climate change mitigation and adaptation, but it also integrates other aspects (water, air, waste, etc.). However, the social part in the EU taxonomy is not yet fully regulated. On the other hand, Georgia's Sustainable Finance Taxonomy has two components, a green and a social taxonomy. In simple terms, each taxonomy should be tailored to local circumstances and contribute to the goals to which it's aligned. In the WB6, there is a proven track record of studies and strategies related to climate change and all WB6 (except for Kosovo*) have developed and adopted National Determined Contributions (NDCs) in line with the Paris Agreement. For WB6, it is highly recommended to focus initially on the NDCs, as they seem to be a logical starting point. By prioritizing the NDCs, the WB6 can ensure that their taxonomy supports local sustainability agendas while aligning with global climate goals.

Table 1 - National Determined Contributions declared (UNFCCC, 2024)

Country	NDC (2030)
Albania	20.9% compared to BAU
Bosnia and Herzegovina	12.8% compared to 2014 (i.e. 33.2% compared to 1990) – unconditional scenario
Kosovo*	Not signatory under the UNFCCC
Montenegro	35% compared to 1990
North Macedonia	51% compared to 1990
Serbia	13.2% compared to 2010 level (i.e. 33.3% compared to 1990)

Concentrating on the NDCs will facilitate a cohesive approach among the WB6, enhancing regional cooperation and enabling a unified response.

Step 3 – Focus on Sectors with Most Impact on Defined Goals

Identifying and focusing on sectors with the most significant impact on sustainability goals is essential for the taxonomy's effectiveness. Key sectors to prioritize may include energy, transport, buildings, industry, agriculture and forestry. The energy sector is critical for climate change mitigation, emphasizing RES, EE and the transition away from fossil fuels. Sustainable transport initiatives, such as electric vehicles and public transportation infrastructure, should be promoted to reduce greenhouse gas emissions. Energy-efficient building practices and sustainable construction methods should be emphasized, while the industry sector should promote cleaner production processes and the use of sustainable materials. Sustainable agricultural practices and forest management should be included to support biodiversity and ecosystem services.

Step 4 – Action Plan for the Taxonomy Framework

Developing a comprehensive action plan is critical for the successful implementation of the regional taxonomy framework. The action plan should outline specific steps, timelines and responsibilities for each phase of the development process. Key components of the action plan include stakeholder engagement and consultation, drafting the conceptual framework, public consultation and feedback, finalization and approval, implementation and capacity building and monitoring and evaluation.

Engaging stakeholders from the outset is crucial for ensuring buy-in and support. The RCB should conduct consultations with key stakeholders, including government agencies, financial institutions, industry representatives and civil society organizations. Based on stakeholder input, the RCB should draft a conceptual framework outlining the key elements of the taxonomy. This framework should define the criteria for classifying sustainable activities and establish guidelines for reporting and disclosure.

Step 5 – Draft Conceptual Framework

Och states that the EU Taxonomy is essential for standardizing sustainable finance and provides a science-based framework. However, Ronse warns that the regulation's impact could be limited by extensive disclosure requirements, limited scope and high data costs, which may discourage participation. To enhance its effectiveness, she recommends expanding the taxonomy to include "yellow" and "red" categories, aiming to mainstream sustainable finance and support the EU's ambitious environmental goals (Och, 2020). The WB6 should follow an "Adapt and Adopt" principle for their taxonomy framework, tailoring the EU taxonomy to meet their unique economic and infrastructural contexts. This approach ensures the framework is relevant and practical for the WB6. Given the region's limited capacities in skills and data availability, a phased implementation of sustainable finance taxonomies is recommended.

Initially, the WB6 should use a whitelist approach, listing specific economic activities considered sustainable. This method is simpler and less resource-intensive than developing comprehensive technical screening criteria (TSC). As stakeholders' capacities improve, the taxonomy can gradually incorporate more detailed criteria and align more closely with the EU's approach, ultimately achieving full alignment within 2-3 years. Key principles should guide the development of the regional taxonomy framework to ensure effectiveness, practicality and alignment with both local and international standards:

- The taxonomy must be interoperable with global standards like the EU taxonomy, using common methodologies, design principles and structures. Employing internationally recognized industrial classification systems, such as the ISIC, will facilitate cross-border capital flows and ensure international comparability.
- The WB6 should learn from and adapt existing taxonomies and guidelines, such as those from South Africa, Colombia and Mongolia. This approach saves time and resources by building on proven methodologies and best practices.
- The taxonomy should complement existing and planned sustainable finance policies and regulations, such as green bonds, green loans and corporate disclosure requirements. This holistic approach will enhance acceptance and implementation.
- The taxonomy should be clear, straightforward and easy to implement, with transparent and easily understandable criteria. This simplicity will help users navigate the taxonomy without confusion and reduce the compliance burden, making it more accessible to a wide range of stakeholders.

Step 6 – Public Consultation and Publishing the Framework

Engaging a broad spectrum of stakeholders, including government agencies, financial institutions, industry representatives (including chambers of trade and economy), academia, civil society and the public, ensures that the framework is comprehensive, practical and widely accepted. The consultation process should involve multiple stages, starting with initial drafts, allowing for iterative feedback and refinement. This participatory approach helps identify potential challenges, gather diverse perspectives and build consensus around the goals and methodologies. Public consultations can be conducted through workshops, seminars, online surveys and public forums.

Once the public consultation phase is complete and the feedback has been incorporated, the framework should be finalized and prepared for publication. Publishing the framework involves making it publicly available through official channels. Clear communication of the framework's objectives, benefits and application procedures will facilitate its adoption and use. Additionally, launching awareness campaigns and holding informational sessions can help promote the taxonomy and educate stakeholders on its significance and operational aspects. These will enhance transparency and trust and ensure that the taxonomy is effectively integrated into the region's sustainable finance practices.

Step 7 – Engage with WB6 Countries to Draft Their Taxonomies

Engaging with the WB6 countries to draft their taxonomies is a crucial step in establishing a coherent and effective regional taxonomy framework. This process should be guided by a set of general recommendations to ensure a structured and inclusive approach, leveraging the principles and best practices outlined in various international guidelines.

The first phase in developing the taxonomy framework involves identifying and designating a lead institution, such as a government ministry or the central bank, to oversee the process. This institution will coordinate efforts, manage stakeholder engagement and ensure alignment with the regional framework. Given the complex

administrative setup and political instability in some WB6 countries, a higher-level institution's decisive role is crucial. A detailed timeline for the taxonomy development process should be created, including key milestones and deadlines. Additionally, a comprehensive stakeholder engagement plan must be formulated, identifying all relevant stakeholders, including government agencies, financial institutions, industry representatives, academia and civil society. Regular consultations, workshops and feedback sessions will ensure broad participation and buy-in.

The next phase involves clearly defining the objectives of the taxonomy, aligning with sustainability goals and international standards like the Paris Agreement and the SDGs. Extensive research and benchmarking against existing taxonomies, such as the EU taxonomy, will provide valuable insights into best practices and help tailor the taxonomy to the specific context of each WB6 economy. A draft design of the taxonomy should be developed, including the classification of economic activities, criteria for sustainability and methodologies for assessment. This draft must be detailed yet flexible to incorporate stakeholder feedback. A pilot phase will then test the draft taxonomy in selected sectors or projects, gathering practical insights and identifying potential issues for improvement.

Based on feedback from the pilot phase and public consultations, the draft taxonomy will be refined and finalized. The final version will be published along with comprehensive guidance documents and explanatory materials to ensure clear understanding and application. Capacity-building programs will be developed and delivered for the organizations that will implement the taxonomy. This includes training sessions, workshops and the provision of resources and tools to enhance technical capabilities. A Monitoring, Evaluation and Learning (MEL) framework may be established to track the implementation and effectiveness of the taxonomy, including key performance indicators (KPIs), data collection methods and regular reporting schedules to ensure continuous improvement.

Step 8 – Monitor and Update the Taxonomy

Regular monitoring and updating of the taxonomy are essential to ensure its ongoing effectiveness, relevance and alignment with evolving sustainability goals and market conditions. This process involves establishing a schedule for annual reviews to evaluate the taxonomy's performance against defined goals, utilizing KPIs such as the number of green investments, the number of aligned projects and reductions in greenhouse gas emissions. Data collection and analysis are crucial, with organizations and financial institutions required to report regularly on their alignment with the taxonomy. Engaging stakeholders through ongoing dialogue with government agencies, financial institutions, industry representatives and civil society is vital for gathering insights and suggestions for improvements. Continuous training and technical assistance, including workshops, seminars and online resources, will support stakeholders in effectively applying the updated taxonomy. Transparency is maintained by publicly reporting the findings from reviews and updates, detailing performance, changes made and the rationale behind those changes. Additionally, the taxonomy should be updated with the latest scientific research and technological advancements, integrating new findings to keep it effective and responsive to market conditions and emerging sustainability challenges by expanding the scope to include new sectors or refining the technical screening criteria.

Conclusion and Recommendations

The article highlights both the progress and challenges faced by the WB6 countries in aligning with sustainable finance principles and the EU Taxonomy. Despite some advancements, significant barriers remain that hinder the full adoption and implementation of sustainable finance practices.

The financial landscape, dominated by banks, coupled with high levels of foreign ownership, has facilitated the adoption of modern business models but also posed challenges in aligning with sustainable finance objectives. The article identifies several key areas that need addressing to foster a sustainable finance ecosystem in the WB6. These include the development of a common regional taxonomy framework, capacity building, policy advocacy and enhanced regional collaboration. The establishment of a regional coordination body is crucial for harmonizing efforts and ensuring alignment with the EU taxonomy and international standards. This body would play a pivotal role in developing guidelines, providing training and promoting sustainable finance across the region.

A key recommendation is the alignment with relevant sustainability goals, particularly the NDCs as a starting point. This focus will help direct investments towards projects that directly contribute to climate goals and promote RES, EE, sustainable agriculture and climate-resilient infrastructure. Additionally, prioritizing sectors with the most significant impact on sustainability goals is essential.

Developing a regional taxonomy framework should follow an “Adapt and Adopt” principle rather than a direct copy-paste approach from the EU taxonomy. This approach ensures the framework is tailored to the unique economic and infrastructural context of the Western Balkan. Starting with a whitelist approach in the initial stages can simplify the implementation process and gradually incorporate more detailed criteria as capacities among stakeholders improve. Monitoring and updating the taxonomy is a critical ongoing process. Establishing regular review cycles, engaging with stakeholders and adapting the taxonomy based on new scientific data and technological advancements are essential steps. Continuous training and technical assistance for stakeholders will help maintain the taxonomy’s effectiveness and relevance.

Public consultation and stakeholder engagement are crucial for the successful development and implementation of the taxonomy. Regular consultations, workshops and feedback mechanisms ensure that the taxonomy is comprehensive, practical and widely accepted. Transparency and clear communication about the taxonomy’s objectives, benefits and application procedures will facilitate its adoption and use. The article emphasizes the importance of a coordinated regional approach to sustainable finance, leveraging initiatives like the CRM. By harmonizing efforts, avoiding fragmented regulatory landscapes and standardizing sustainable finance classifications and reporting, the WB6 can enhance regional co-operation and attract international investment.

References

1. AFSA. (2023). STRATEGY OF THE ALBANIAN FINANCIAL SUPERVISORY AUTHORITY 2023-2027. Albanian Financial Supervisory Authority.
2. BARS. (2023). Guidelines for managing risks associated with climate change and environmental risks. Banja Luka: Banking Agency of Republika Srpska.

3. BoA. (2023). Strategy - Roadmap for the management and supervision of climate-related financial risks in the financial sector. Tirana: Bank of Albania.
4. CBBH. (2022). Strategic plan of the Central Bank of Bosnia and Herzegovina. Sarajevo: Central Bank of Bosnia and Herzegovina.
5. CBCG. (2023). Annual Report on Operations 2022. Podgorica: Central Bank of Montenegro.
6. EBRD. (2024). Can the Western Balkans converge towards EU living standards? London: European Bank for Reconstruction and Development.
7. European Commission. (2024, 5 7). European Commission. Retrieved from Questions and Answers on the Sustainable Finance package: https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_3194
8. European Commission. (2023). North Macedonia 2023 Report. Brussels: European Commission.
9. FBA. (2023). Management and Supervision of Risks Related to Climate Change and the Environment in the Banking Sector. Sarajevo: Federal Banking Agency.
10. FinSAC. (2024). Annual Report 2023. Washington DC: The World Bank.
11. IMF. (2023). IMF Country Report No. 23/372.
12. Limani, V. (2024). Quo vadis sustainable finance? Drivers and barriers to green finance trends in the Western Balkans. *Economic Vision: International Scientific Journal in Economics*, 11, pp. 120-133. doi:10.62792/ut.evision.v11.i21-22.p2715
13. MoF Serbia. (2024). Sustainable finance framework for Republic of Serbia. Belgrade: Ministry of Finance of Serbia.
14. MSDT Mne. (2016). National Strategy for sustainable development of Montenegro. Podgorica: Ministry of sustainable development and tourism of Montenegro.
15. Mulita, R. (2023). Green Finance for Sustainable Development in the Western Balkans. 9th International Scientific Conference ERAZ 2023. doi:<https://doi.org/10.31410/ERAZ.S.P.2023.33>
16. NBRM. (2022). Climate Risks – Results from the Survey conducted in banks and savings houses in the Republic of North Macedonia. Skopje: National Bank of the Republic of North Macedonia.
17. NBRM. (2023). Report on the risks in the banking system of the Republic of North Macedonia in the third quarter of 2023. Skopje: National Bank of the Republic of North Macedonia.
18. Och, M. (2020). Sustainable Finance and the EU Taxonomy Regulation – Hype or Hope? Jan Ronse Institute - Working Paper No. 2020/05.
19. SBFN. (2024). SBFN Toolkit - Sustainable Finance Taxonomies. IFC & SBFN.
20. Schützea, F., & Stede, J. (2024). The EU sustainable finance taxonomy and its contribution to climate neutrality. *Journal of Sustainable Finance & Investment*, 14(1), pp. 128-160. doi:<https://doi.org/10.1080/20430795.2021.2006129>
21. Sredojević, S., & Sredojević, D. (2021). Sustainable Finance – Evolution or Revolution in the Banking Sector. *Banking*, 50. doi:10.5937/bankarstvo2102114S
22. Suljić, V. (2021). The analysis of existing green financial products in Bosnia and Herzegovina. Sarajevo: UNDP.
23. UNDP. (2022). Serbia Green Bond Reporting. Belgrade: UNDP.
24. UNFCCC. (2024, 6 12). United Nations Framework Convention on Climate Change. Retrieved from NDC Registry: <https://unfccc.int/NDCREG>

Datum prijema: 17.08.2024. god.
Datum prihvatanja: 17.11.2024. god.

DOI: 10.5937/bankarstvo2403117V

BANKE KAO OBVEZNICI POREZA NA DODATU VREDNOST: SLUČAJ REPUBLIKE SRBIJE

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Sažetak: Dosadašnja istraživanja o oporezivanju bankarskog sektora su se primarno bavila porezom na dobitak. Pitanje oporezivanja banaka porezom na dodatu vrednost (PDV-om) je relativno zapostavljeno. Stoga je u ovom radu ispitan PDV status poslovnih banaka u Republici Srbiji i uticaj promene poreske regulative na njihov PDV status. S tim u vezi, istraživanje je pokazalo da su sve aktivne banke u Republici Srbiji obveznici PDV-a: trinaest banaka je jednomesečni, dok je sedam tromesečni PDV obveznik. Iako je većina bankarskih aktivnosti oslobođena PDV-a, određene aktivnosti, poput iznajmljivanja sefova, čuvanja i upravljanja hartijama od vrednosti, naplate potraživanja za druga lica ili savetodavnih usluga, su oporezive PDV-om po opštoj stopi. Dodatno, nakon promene poreske regulative o utvrđivanju ukupnog prometa za svrhe evidentiranja u PDV sistem na početku 2013. godine, značajan broj banaka je promenio svoj PDV status iz jednomesečnog u tromesečnog PDV obveznika. S tim u vezi, rezultati istraživanja dopunjuju postojeća istraživanja o oporezivanju banaka PDV-om, ali mogu predstavljati i korisnu osnovu za reformisanje sistema oporezivanja banaka u budućnosti.

Ključne reči: banke, porez, PDV, poreska oslobođenja, poreska regulativa.

JEL klasifikacija: F38, G21, H25, K34

Uvod :

U poslednjoj deceniji česti su novinski naslovi koji najavljuju izmene u oporezivanju banaka. S tim u vezi, neke zemlje su kreirale i implementirale poseban porez na banke, neke oporezuju banke po višim propisanim stopama poreza na dobitak u odnosu na preduzeća iz realnog sektora, dok neke preispituju oporezivanje banaka porezom na dodatu vrednost (PDV-om). Neke od ovih poreskih alternativa su relativno dobro istražene u akademskoj literaturi, ali je pitanje PDV-a u bankarskom sektoru relativno zapostavljeno.

Generalno, oporezivanje banaka i preduzeća iz realnog sektora se u većini zemalja zasniva na istim poreskim propisima. Oporezivanje dobitka koji banke ostvare i dohotka koji banke isplaćuju fizičkim licima se vrši skoro na isti način kao u preduzećima iz realnog sektora (Vržina, 2023). S druge strane, primena PDV-a u bankarskom sektoru je specifična u odnosu na preduzeća iz realnog sektora, primarno usled specifičnosti bankarske delatnosti.

Trenutno stanje, prema kojem je većina bankarskih aktivnosti oslobođena PDV-a, je predmet čestih rasprava, kako u akademskoj javnosti, tako i u svakodnevnoj praksi. Akademski stavovi se kreću od zalaganja za oporezivanje svih bankarskih aktivnosti PDV-om (Chaudhry i saradnici, 2015), uz argumente da bi to pozitivno uticalo na sve interesne grupe, do bojazni da bi uvođenje PDV-a na bankarske aktivnosti moglo previše da optereti klijente banke, a primarno fizička lica (Genser i Winker, 1997). Takođe, iako je većina bankarskih aktivnosti oslobođena PDV-a, brojne banke u svetu su obveznici PDV-a.

Predmet rada jesu poslovne banke iz Republike Srbije, kao obveznici PDV-a. Iako je u Republici Srbiji i okolnim zemljama u razvoju zabeležen značajan broj istraživanja koja se bave poslovnim bankama, mali broj njih se bavi oporezivanjem banaka. Takođe, dosadašnja istraživanja o oporezivanju banaka su se primarno bavila porezom na dobitak, kako u svetu (na primer Meeks i Meeks, 2014; Merz i Overesch, 2016; Lazar i Andries, 2022), tako i u Republici Srbiji (na primer Todorović i saradnici, 2019; Vržina, 2022; Putica, 2023).

Rad ima dva osnovna cilja. Prvi cilj rada jeste da ispita da li su banke u Republici Srbiji obveznici PDV-a, kao i kakav je njihov PDV status (da li su jednomesečni ili tromesečni PDV obveznici). Drugi cilj rada je da ispita kako učestale promene poreske regulative utiču na PDV status banaka u Republici Srbiji. Promene poreske regulative u Republici Srbiji su relativno česte, imajući u vidu težnju za kontinuiranim usklađivanjem poreske regulative sa regulativom Evropske unije.

Istraživanje u ovom radu doprinosi postojećim istraživanjima u oblasti oporezivanja banaka, kako na međunarodnom nivou (s obzirom na to da se PDV sistem primenjuje u većini zemalja sveta), tako i na nivou Republike Srbije. Istraživanje posebno doprinosi skromnom broju prethodnih istraživanja u oblasti oporezivanja banaka PDV-om. Prema najboljim saznanjima autora, ovo je prvo istraživanje o oporezivanju banaka PDV-om u bankama u Republici Srbiji. Zapravo, i u razvijenim evropskim državama je broj istraživanja o PDV-u u bankama relativno mali (na primer Huizinga, 2004; De la Fera i Walpole, 2009; Baydur i Yilmaz, 2021).

Izuzev uvoda i zaključka, rad ima tri dela. U prvom delu je data teorijska osnova problema oporezivanja banaka PDV-om. U drugom delu je dat pregled primene regulative PDV-a u bankama u Republici Srbiji. U trećem delu je prikazano empirijsko istraživanje o PDV-u u bankama u Republici Srbiji.

1. Teorijska osnova

PDV se smatra najrazvijenijim opštim porezom na potrošnju. Razvijen je u drugoj polovini dvadesetog veka i prvo primenjen u nekoliko razvijenih država (Danska, Francuska i Nemačka) i danas je u primeni u svim evropskim državama i većem delu sveta (Acosta-Oramechea i Morozumi, 2021). Glavna prednost PDV sistema se ogleda u tzv. faktura-kredit sistemu (što je varijanta PDV-a koju primenjuje najveći broj zemalja), a koja omogućava PDV obvezniku koji kupuje da odbije PDV koji je obračunao PDV obveznik koji prodaje (Grinberg, 2010). Na taj način, učesnici u transakciji kontrolišu jedni druge, pa se uloga državne administracije minimizira.

S druge strane, oporezivanje banaka i ostalih finansijskih institucija predstavlja jedno od najkontroverznijih pitanja savremenih poreskih sistema. U teorijskim raspravama i realnom svetu se često mogu čuti stavovi da banke treba dodatno oporezivati. Takođe, neretko su banke prva grupa pravnih lica kojoj se uvode dodatni porezi – na primer, u uslovima ekonomskih kriza (poput krize izazvane virusom Covid-19) u cilju jačanja poreskih prihoda države (Sibrtova, 2023).

U kontekstu PDV-a, u svetu nema jedinstvenog stava po pitanju načina na koji banke treba oporezovati ovim poreskim oblikom. Do sada je bilo dosta pokušaja značajnijeg oporezivanja banaka PDV-om (Lopez-Laborda i Pena, 2018) ili sličnim višefaznim porezom na potrošnju (Hoffman, 1988), ali konsenzus po tom pitanju na međunarodnom nivou još uvek nije postignut. Kreatori fiskalne politike moraju biti oprezni sa uvođenjem PDV-a na osnovne bankarske aktivnosti, balansirajući između specifičnosti bankarske delatnosti (kojoj PDV nije originalno namenjen) i značaja bankarskog sektora za privredu (Schenk, 2010).

Trenutno, u većini zemalja sveta, uključujući i države Evropske unije, banke su oslobođene obračuna i plaćanja PDV-a na većinu aktivnosti (Poddar i English, 1997; Baydur i Yilmaz, 2021). Ovakav stav je, na nivou Evropske unije, usaglašen u drugoj polovini dvadesetog veka, delom čak i zbog kompleksnosti bankarske delatnosti i kompleksnosti potencijalnog oporezivanja banaka PDV-om (Huizinga, 2004). S tim u vezi, Poddar i English (1997) navode da je finansijski sektor jedan od sektora u kojem je operativna primena PDV sistema najteža. S druge strane, neke bankarske usluge se oporezuju PDV-om u većini država. S tim u vezi, Huizinga (2004) navodi primere izdavanja sefova u zakup ili savetodavnih usluga koje banka pruža.

U vezi sa poreskim prihodima države, Baydur i Yilmaz (2021) su pokazali da bi uvođenje PDV-a na osnovne bankarske poslove (aktivne, pasivne i neutralne poslove) nedvosmisleno dovelo da rasta poreskih prihoda države. Dodatno, uvođenjem PDV-a bi se mogle otkloniti značajne distorzije i neefikasnosti u privredi koje uzrokuje odsustvo oporezivanja bankarskih poslova PDV-om (Gholami i Abasinejad, 2016). Ipak, značajna briga po ovom pitanju se odnosi na reakcije bankarskog sektora na ovakvo uvođenje PDV-a. S tim u vezi, prethodna istraživanja su se primarno bavila efektima uvođenja PDV-a (na određene bankarske usluge) na cenu bankarskih usluga. Drugim rečima, ispitivano je da li bi banke bile u mogućnosti da teret PDV-a prebace na svoje klijente. Neka istraživanja u poslednje dve decenije u Evropi (na primer Masiukiewicz i Dec, 2012; Ceponis i saradnici, 2021) pokazuju da su banke u mogućnosti da specifično poresko opterećenje, koje se nameće jedino bankama na bazi vrednosti njihove imovine (tzv. bank tax) u potpunosti prebace na svoje klijente, kroz povećanje cene usluga. Takođe, Chiorazzo i Milani (2011) pokazuju da su banke u poziciji da opterećenje PDV-om u potpunosti prebace na svoje klijente.

Genser i Winker (1997) smatraju da ne bi sve kategorije klijenata bile pogođene u istoj meri, ukoliko

bi spektar bankarskih usluga oporezovanih PDV-om bio proširen. Zapravo, oni smatraju da bi pravna lica (kao klijenti banaka) bili pogođeni uvođenjem PDV-a u manjoj meri, s obzirom na to da bi taj PDV koristili kao prethodni. Ipak, ovo važi samo pod pretpostavkom da su pravna lica obveznici PDV-a. S druge strane, fizička lica bi bila pogođena uvođenjem PDV-a u većoj meri, s obzirom na to da bi morali da plate veću cenu za korišćenje bankarskih usluga bez dodatnih pogodnosti.

Štaviše, u nekim teorijskim stavovima (na primer Huizinga, 2004) se pominje da bi se uvođenje PDV-a na finansijske transakcije trebalo odnositi samo na odnose između banaka i fizičkih lica (kao klijenata banke). S druge strane, na finansijske transakcije između banaka i pravnih lica ne bi ni trebalo obračunavati PDV, jer bi pravna lica svakako koristila taj PDV kao odbitni. Ovakav pristup bi, između ostalog, zahtevao da banke imaju različite cene finansijskih usluga za pravna i fizička lica, ali i da jasno podele svoje klijente na pravna lica i fizička lica, što bi sa poreskog aspekta u određenim slučajevima moglo biti upitno – na primer kod preduzetnika, koji su fizička lica, ali obavljaju privrednu delatnost.

Trenutno stanje, prema kojem je većina bankarskih aktivnosti oslobođena PDV-a, u određenoj meri može staviti čak i banke u nepovoljnu poziciju (Huizinga, 2004). Ovo se posebno odnosi na banke koje posluju u zemljama sa relativno visokim opštim stopama PDV-a. S tim u vezi, Hodžić i Celebi (2017) pokazuju da se opšte stope PDV-a značajno razlikuju između zemalja. Kada su opšte stope PDV-a relativno visoke, banke plaćaju relativno visoke cene sa PDV-om za nabavljene inpute. S druge strane, banke obično nemaju pravo da tako visoki PDV koriste kao odbitni, s obzirom na to da su aktivnosti zbog kojih su inputi nabavljeni oslobođene PDV-a. Na taj način, banke koje posluju u zemljama sa relativno nižim opštim stopama PDV-a imaju, na međunarodnom nivou posmatrano, konkurentsku prednost u odnosu na banke koju posluju u zemljama sa relativno višim opštim stopama PDV-a.

Sagledavajući sve prednosti i nedostatke izuzimanja bankarskih aktivnosti iz PDV sistema, brojne zemlje su uvele određene sisteme za ublažavanje nedostataka ovakvog načina (ne)oporezivanja. Dobar pregled takvih alternativnih sistema daju Lopez-Laborda i Pena (2017). Neki od takvih sistema, koji dozvoljavaju bankama (bar delimično) da PDV kod nabavki inputa koriste kao prethodni su (Schatan, 2003; De la Feria i Walpole, 2009):

- metod nulte stope (engl. zero rate method), u kojem se PDV ne obračunava na bankarske aktivnosti, ali banke imaju pravo da koriste PDV kod nabavki inputa kao prethodni;
- izuzimanje sa delimičnim odbitkom (engl. exemption with partial input credits), u kojem se PDV ne obračunava na osnovne bankarske aktivnosti, ali je bankama dozvoljeno da delimično koriste PDV kod nabavki inputa kao prethodni;
- oporezivanje naknada i provizija (engl. taxation of fees and commissions), u kojem je obavezan obračun PDV-a na bankarske naknade i provizije koje se mogu eksplicitno utvrditi, a banke imaju pravo da koriste PDV kod nabavki inputa kao prethodni i
- opciono oporezivanje (engl. option to tax), u kojem banke imaju pravo izbora da obračunavaju PDV samo na bankarske naknade i provizije, ili i na neto kamatnu maržu (razliku kamatnih prihoda i kamatnih rashoda).

Neke zemlje su implementirale metode oporezivanja banaka PDV-om na bazi finansijskih performansi koje iskazuju (Keen i saradnici, 2010; De la Feria i Krever, 2012). Kod ovih metoda, banke nemaju pravo da PDV kod nabavki inputa koriste kao prethodni. Primera radi, takvi su sledeći metodi:

- metod neto poslovnog dobitka (engl. net operating income method), u kojem banke obračunavaju i plaćaju PDV na iskazani periodični neto poslovni dobitak;
- metod dodavanja (engl. addition method), u kojem se osnovica za PDV dobija kao zbir troškova zarada, zakupa, rashoda kamate i neto dobitka i
- metod oduzimanja (engl. subtraction method), u kojem se osnovica za PDV utvrđuje kao razlika između prihoda i nabavki banke.

Dodatno, neke zemlje su razvile i implementirale potpuni novi porez na potrošnju, koji se značajno razlikuje od uobičajenog PDV-a (Keen i saradnici, 2016). Ipak, većina zemalja u razvoju, posebno evropskih, primenjuje poresko oslobođenje na većinu bankarskih aktivnosti, dok se bankama dozvoljava da PDV plaćen pri nabavci inputa koriste kao prethodni samo u meri u kojoj će nabavljeni inputi biti korišćeni za aktivnosti na koje se PDV obračunava.

2. PDV u bankama u Republici Srbiji

Primena PDV sistema je u Republici Srbiji započela 01.01.2005. godine, na osnovu Zakona o PDV-u donetog 2004. godine. Time je Republika Srbija postala jedna od poslednjih evropskih država koje su implementirale PDV kao opšti porez na potrošnju. U skladu sa Zakonom o PDV-u, u Republici Srbiji se primenjuje i određeni broj podzakonskih akata. Ista PDV regulativa koja se primenjuje na preduzeća iz realnog sektora se primenjuje i na poslovne banke.

Opšta stopa PDV-a u Republici Srbiji trenutno iznosi 20%. Takođe, u primeni je i posebna PDV stopa od 10%, koja se primenjuje na određena dobra i usluge, primarno esencijalnog karaktera. U skladu sa Zakonom o PDV-u, obveznici PDV-a mogu biti registrovani kao jednomesečni ili tromesečni (kvartal-ni) obveznici, pri čemu je rok za podnošenje poreske prijave i plaćanje PDV-a petnaest dana od isteka poreskog perioda (meseca ili kvartala).

Poput ostalih lica, i za banke važi prag od osam miliona dinara prometa za obavezno evidentiranje u PDV sistem. Drugim rečima, banke koje su u prethodnih godinu dana ostvarile promet veći od tog praga moraju biti evidentirane u PDV sistem. Banke čiji je promet manji od osam miliona dinara se mogu dobrovoljno evidentirati u PDV sistem. Dodatno, banke čiji je promet veći od pedeset miliona dinara u poslednjih godinu dana moraju biti jednomesečni PDV obveznici.

Izuzetno važno pitanje, a posebno za banke, predstavlja definisanje prometa koji ulazi u prag od osam miliona dinara za svrhe evidentiranja u PDV sistem. S tim u vezi, moguće je identifikovati sledeće vrste prometa:

- promet oporeziv PDV-om;
- promet oslobođen PDV-a sa pravom na odbitak prethodnog poreza (u skladu sa članom 24. Zakona o PDV-u) i
- promet oslobođen PDV-a bez prava na odbitak prethodnog poreza (u skladu sa članom 25. Zakona o PDV-u).

U prag od osam miliona dinara uključuje se promet oporeziv PDV-om i promet oslobođen PDV-a sa pravom na odbitak prethodnog poreza, premda je potrebno isključiti promet dobara i usluga za koji se smatra da je ostvaren u inostranstvu. S druge strane, osnovni bankarski poslovi (kreditni poslovi, depozitni poslovi i poslovi platnog prometa) predstavljaju promet oslobođen PDV-a bez prava

na odbitak prethodnog poreza, što znači da se najveći deo prometa banaka ne uključuje u prag za evidentiranje u PDV sistem.

U vezi sa kreditima koje banka odobrava, kreditni poslovi banke su oslobođeni PDV-a. Takođe, gotovo svi poslovi povezani sa odobravanjem kredita su oslobođeni PDV-a, poput obrade i realizacije zahteva za kredit (jer je reč o sporednom prometu uz odobravanje kredita), posredovanja pri kreditnim poslovima, ocene kreditne sposobnosti koju vrši poslovna banka i slično. S druge strane, kada banka zahteva od Udruženja banaka Srbije (UBS) izdavanje izveštaja o bonitetu fizičkih i pravnih lica, UBS je obavezan da obračuna PDV, dok banka nema pravo da taj PDV koristi kao prethodni. Takođe, poput kreditnih poslova, i depozitni poslovi koje banka obavlja su oslobođeni PDV-a.

U kontekstu poslova platnog prometa, sve usluge koje banka pruža klijentima da bi omogućila obavljanje platnog prometa su oslobođene PDV-a bez prava na odbitak prethodnog PDV-a, u skladu sa članom 25. Zakona o PDV-u. Drugim rečima, naknade po osnovu isplate gotovog novca sa tekućeg računa i transfera novca sa jednog na drugi tekući račun su oslobođene PDV-a. Takođe, naknade koje se plaćaju po osnovu izdavanja debitnih i kreditnih platnih kartica su oslobođene PDV-a.

Za određene usluge platnog prometa su važna pravila o glavnom i sporednom prometu. Primera radi, usluga otvaranja, vođenja i održavanja računa je oslobođena PDV-a, kao i izrada izveštaja i sličnih dokumenata o stanju i prometu na računu. Međutim, neretko se uz otvaranje tekućeg računa ugovaraju dodatne usluge, poput slanja obaveštenja ili izveštaja SMS porukama ili mejlom. S tim u vezi, kada bi ove dodatne usluge bile ugovorene zasebno, one bi bile oporezive PDV-om po opštoj stopi. Međutim, kada se one ugovore zajedno sa osnovnom uslugom otvaranja računa, onda su oslobođene PDV-a, jer se smatraju sporednim prometom uz glavni promet (koji je oslobođen PDV-a).

S druge strane, određene aktivnosti koje su samo indirektno povezane sa uslugama platnog prometa, nisu oslobođene PDV-a. Primera radi, kada banka vrši zakup prostora za bankomate ili nabavlja usluge softverske podrške u vezi sa bankomatima, dobavljač ovih usluga je dužan da obračuna PDV po stopi od 20% (ukoliko je dobavljač obveznik PDV-a), dok banka nema pravo na odbitak PDV-a iz ove aktivnosti.

Iako je većina bankarskih poslova oslobođena PDV-a (bez prava na odbitak prethodnog PDV-a), moguće je identifikovati i značajan broj bankarskih poslova koji su oporezivi PDV-om (i po osnovu kojih banka ima pravo na odbitak prethodnog PDV-a). Takvi su, primera radi, poslovi iznajmljivanja sefova, čuvanja i upravljanja hartijama od vrednosti i naplate potraživanja za druga lica. Takođe, kada banka vrši uslugu registracije kredita kod Narodne banke Srbije (koji je rezidentno lice uzelo od nerezidentnog lica), dužno je da obračuna PDV po stopi od 20%. Dodatno, aktivnosti banke koje su uobičajene i za preduzeća iz realnog sektora (poput davanja stvari u zakup, prodaje opreme ili savetodavnih usluga) su oporezive PDV-om.

Pojedine nabavke koje banke vrše se koriste i za promet oslobođen PDV-a (bez prava na odbitak prethodnog PDV-a) i za promet oporeziv PDV-om. To znači da, po osnovu takvih nabavki, banka ima pravo na delimičan odbitak prethodnog PDV-a (u meri u kojoj će nabavka biti korišćena za oporeziv promet). Primera radi, banka može primiti račun za video nadzor, koji se odnosi na video nadzor sefova i video nadzor kreditnog odeljenja. Po osnovu video nadzora sefova postoji pravo na odbitak prethodnog PDV-a, a po osnovu video nadzora kreditnog odeljenja ne. U ovakvim slučajevima, banke vrše podelu prethodnog PDV-a prema ekonomskoj pripadnosti.

Podela prethodnog PDV-a prema ekonomskoj pripadnosti se vrši prema kriterijumu koji banka definiše. Primera radi, podela prethodnog PDV-a u vezi sa video nadzorom bi se mogla izvršiti na bazi kvadratnih

metara koje video nadzor pokriva. Tako, ukoliko video nadzor pokriva deset kvadratnih metara prostorije sa sefovima i četrdeset kvadratnih metara kreditnog odeljenja, banka bi imala pravo da koristi 20% iskazanog PDV-a iz primljenog računa za video nadzor.

Ukoliko podela prethodnog PDV-a prema ekonomskoj pripadnosti nije moguća, banke, u skladu sa Zakonom o PDV-u, mogu izvršiti srazmerni odbitak PDV-a. Procenat srazmernog odbitka se utvrđuje stavljanjem u odnos prometa dobara i usluga sa pravom na odbitak prethodnog PDV-a (u koji nije uključen PDV) i ukupnog prometa dobara i usluga (u koji nije uključen PDV), posmatrano za period od 1. januara tekuće godine do isteka poreskog perioda za koji se poreska prijava podnosi. Ipak, iskustva iz realnog sveta pokazuju da mnoge banke, zbog kompleksnosti obračuna, ne vrše ni podelu prethodnog PDV-a prema ekonomskoj pripadnosti, ni obračun srazmernog odbitka PDV-a, već propuštaju priliku da koriste prethodni PDV po osnovu određenih nabavki.

3. Empirijsko istraživanje

3.1. Metodologija istraživanja

Empirijsko istraživanje je obuhvatilo sve poslovne banke u Republici Srbiji, koje su imale dozvolu za rad i bile aktivne na dan 01.07.2024. godine. Identifikovano je dvadeset takvih banaka, koje su prikazane u Tabeli 1. Generalno, bankarsko tržište je u Republici Srbiji u procesu kontinuirane konsolidacije, pri čemu je primetno značajno smanjenje broja banaka – primera radi, na kraju 2016. godine u Republici Srbiji je poslovalo trideset banaka (Đurđević & Furtula, 2023). Takođe, učestale su i značajne promene u vlasničkim strukturama banaka, kao i promene naziva banaka. Poslednja promena naziva je zabeležena u maju 2024. godine, kada je Mobi Banka promenila ime u Yettel Bank.

Tabela 1. Spisak uzorkovanih banaka

R.b.	Naziv banke	PIB	R.b.	Naziv banke	PIB
1.	3 Banka	101643574	11.	Eurobank Direktna	100002532
2.	Addiko Bank	100228215	12.	Halkbank	100895809
3.	Adriatic Bank	100003148	13.	Mirabank	108851504
4.	AIK Banka	100618836	14.	NLB Komercijalna Banka	100001931
5.	ALTA Banka	100001829	15.	OTP Banka Srbija	100584604
6.	API Bank	105701111	16.	Procredit Bank	100000215
7.	Banca Intesa	100001159	17.	Raiffeisen Banka	100000299
8.	Bank of China Srbija	109837136	18.	Srpska Banka	100000387
9.	Banka Poštanska Štedionica	100002549	19.	UniCredit Bank Srbija	100000170
10.	Erste Bank	101626723	20.	Yettel Bank	100000049

Napomena: PIB predstavlja poreski identifikacioni broj banke.

Ispitivanje PDV statusa uzorkovanih banaka je izvršeno na osnovu javno dostupnih podataka Poreske uprave Republike Srbije. Zapravo, na zvaničnom sajtu Poreske uprave je moguće pristupiti PIB registru (www.purs.gov.rs/pib.html), na kojem je moguće proveriti da li je neko pravno lice obveznik PDV-a, da li je jednomesečni ili tromesečni obveznik, kada se evidentiralo u PDV sistem, kao i da li je menjalo status iz jednomesečnog u tromesečnog PDV obveznika i obrnuto. Ispitivanje PDV statusa uzorkovanih banaka je izvršeno na dan 01.07.2024. godine.

3.2. Rezultati istraživanja

U Tabeli 2 je predstavljen PDV status svih aktivnih banaka u Republici Srbiji. Primetno je da su sve banke obveznici PDV-a. Pri tome, više je banaka koje su jednomesečni PDV obveznici (trinaest) u odnosu na tromesečne PDV obveznike (sedam). To ukazuje na činjenicu da su sve banke u Republici Srbiji prešle prag od osam miliona dinara prometa u poslednjih godinu dana ili su dobrovoljno odlučile da budu registrovane u PDV sistem.

Tabela 2. PDV status banaka u Republici Srbiji

R.b.	Naziv banke	Obveznik PDV-a	Vrsta obveznika	Datum ulaska u PDV
1.	3 Banka	Da	Tromesečni	29.09.2004.
2.	Addiko Bank	Da	Jednomesečni	29.09.2004.
3.	Adriatic Bank	Da	Jednomesečni	27.09.2004.
4.	AIK Banka	Da	Jednomesečni	30.09.2004.
5.	ALTA Banka	Da	Tromesečni	29.09.2004.
6.	API Bank	Da	Tromesečni	03.09.2008.
7.	Banca Intesa	Da	Jednomesečni	22.09.2004.
8.	Bank of China Srbija	Da	Jednomesečni	22.12.2016.
9.	Banka Poštanska Štedionica	Da	Jednomesečni	20.09.2004.
10.	Erste Bank	Da	Jednomesečni	23.09.2004.
11.	Eurobank Direktna	Da	Jednomesečni	09.09.2004.
12.	Halkbank	Da	Tromesečni	29.09.2004.
13.	Mirabank	Da	Jednomesečni	01.01.2017.
14.	NLB Komercijalna Banka	Da	Jednomesečni	23.09.2004.
15.	OTP Banka Srbija	Da	Jednomesečni	28.09.2004.
16.	Procredit Bank	Da	Tromesečni	24.09.2004.
17.	Raiffeisen Banka	Da	Jednomesečni	29.09.2004.
18.	Srpska Banka	Da	Tromesečni	29.09.2004.
19.	UniCredit Bank Srbija	Da	Jednomesečni	30.09.2004.
20.	Yettel Bank	Da	Tromesečni	01.09.2004.

Ovakvi nalazi razlikuju banke u odnosu na neke druge finansijske institucije u Republici Srbiji. Tako je u Republici Srbiji moguće identifikovati neka osiguravajuća društva koja nisu PDV obveznici. Primera radi, OTP Osiguranje, Sogaz Osiguranje i Sava Životno Osiguranje nisu obveznici PDV-a u Republici Srbiji.

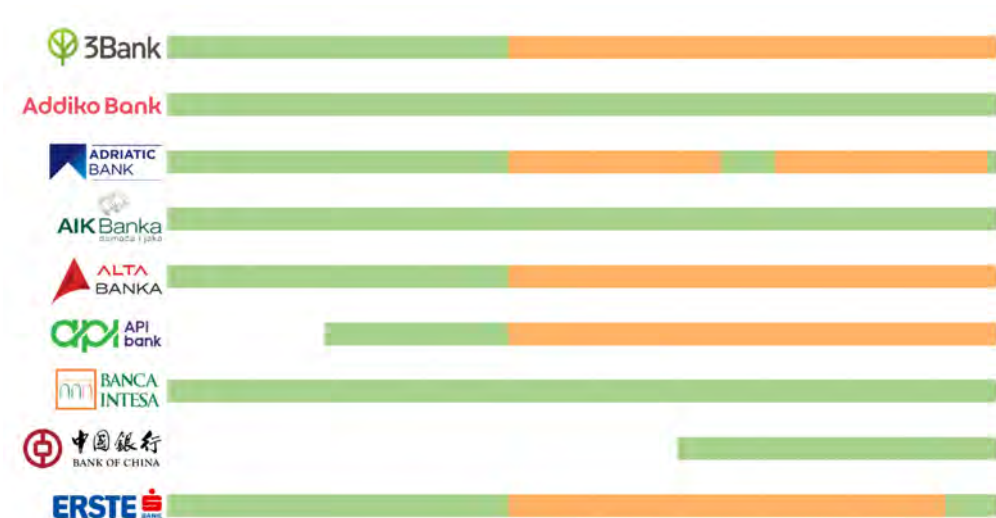
Interesantno je primetiti da su sve banke u Republici Srbiji obveznici PDV-a, iako je većina bankarskih aktivnosti oslobođena PDV-a. Jedan od razloga ovakvog nalaza se može pronaći u relativno niskom pragu za ulazak u PDV sistem od svega osam miliona dinara. Ovaj prag je uveden na početku 2013. godine, kada je povećan sa četiri miliona na osam miliona dinara. Ipak, od tada su u Republici Srbiji zabeležene značajne godišnje stope inflacije (posebno tokom ekonomske krize izazvane pandemijom Covid-19), što je dovelo do rasta cena bankarskih usluga. S druge strane, limit za registrovanje u PDV sistem nije menjan, što je dovelo do toga da banke (u uslovima rasta cena) lakše dostižu ovaj limit.

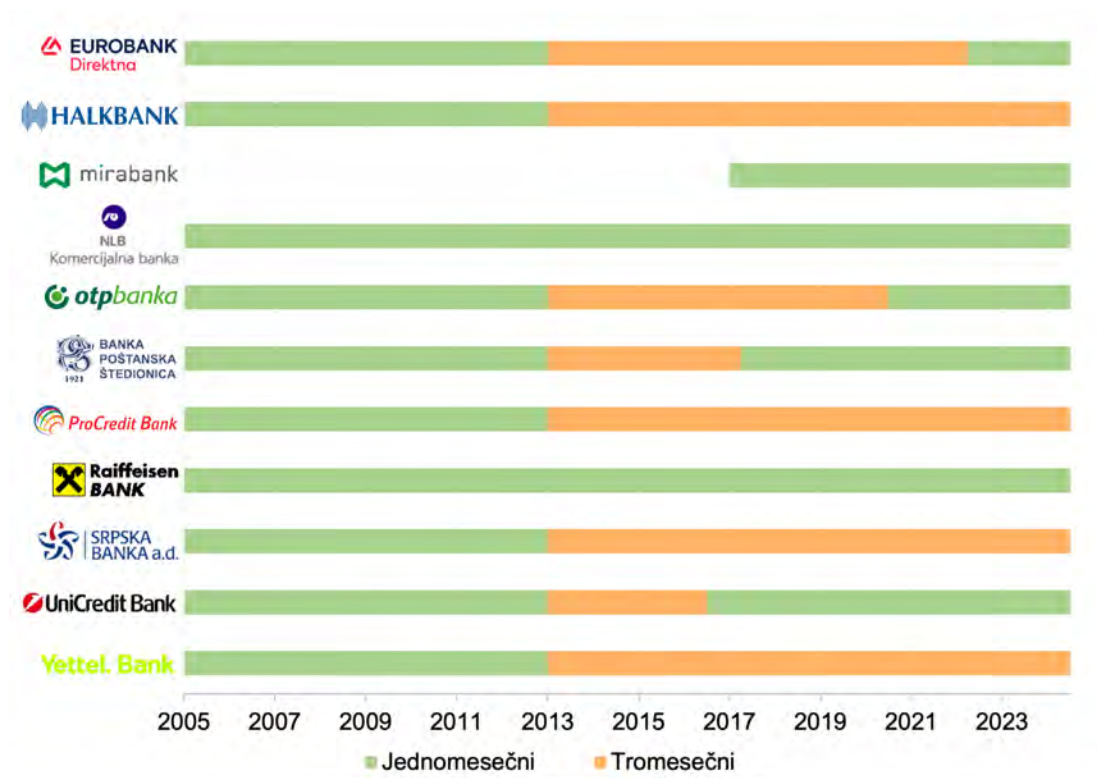
Takođe, važno je primetiti da samo sedam banaka (Addiko Bank, AIK Banka, Banca Intesa, Bank of China Srbija, Mirabank, NLB Komercijalna Banka i Raiffeisen Banka) nije menjalo svoj PDV status, s obzirom na to da su jednomesečni PDV obveznici od ulaska u PDV sistem. Ostale banke su menjale svoj status iz jednomesečnog u tromesečnog PDV obveznika i obrnuto. Ovakve promene su prikazane na Slici 1.

Verovatno najbitniji momenat u domenu PDV-a u bankama u Republici Srbiji se desio 01.01.2013. godine, kada je čak trinaest uzorkovanih banaka promenilo status iz jednomesečnog u tromesečnog PDV obveznika. Pre tog datuma su sve uzorkovane banke bile jednomesečni PDV obveznici. Razlog za ovakvu promenu na početku 2013. godine treba tražiti u izmenama Zakona o PDV-u, koje su stupile na snagu 01.01.2013. godine.

Zapravo, od 01.01.2013. godine, promet iz člana 25. Zakona o PDV-u (oslobođen PDV-a bez prava na odbitak prethodnog poreza) ne ulazi u prag od osam miliona dinara za svrhe evidentiranja u PDV sistem. Na ovaj način je omogućeno mnogim pravnim licima da se obrišu iz evidencije PDV-a. Ipak, ovakvim pravnim licima je ostavljena mogućnost da budu PDV obveznici na dobrovoljnoj bazi. U kontekstu banaka, s obzirom na to da promet iz člana 25. Zakona o PDV-u predstavlja osnovnu delatnost banaka, ovakve izmene Zakona o PDV-u su omogućile mnogim bankama da smanje ukupan promet za svrhe evidentiranja u PDV sistem. Ipak, ni jedna banka nije mogla (ili nije želela) da se izbriše iz PDV sistema, već je većina banaka samo promenila status iz jednomesečnog u tromesečnog PDV obveznika.

Slika 1. PDV status banaka u Republici Srbiji u periodu od 2005. do 2024. godine





Promena poreske regulative je određenim bankama (koje su promenile svoj PDV status u tromesečnog PDV obveznika) donela određene benefite. Zapravo, ove banke imaju manje administrativnih obaveza u domenu PDV-a, jer će PDV obračunavati i plaćati četiri puta u toku godine, umesto dvanaest puta u slučaju jednomesečnih obveznika. Takođe, prelazak na tromesečnog PDV obveznika može poboljšati likvidnost banaka, jer će u dužem vremenskom periodu moći da koriste sredstva koja treba da plate državi u vidu poreza. Primera radi, prvi rok za plaćanje PDV-a u kalendarskoj godini za jednomesečne obveznike je 15. februar, dok je prvi rok za tromesečne obveznike tek 15. april.

Nekoliko uzorkovanih banaka je više puta menjalo svoj PDV status nakon 2013. godine – iz jednomesečnog obveznika u tromesečnog i obrnuto. Ove promene su primarno posledica promene ukupnog prometa banaka (iznad ili ispod pedeset miliona dinara, koliko iznosi prag za jednomesečne PDV obveznike) za svrhe utvrđivanja njihovog PDV statusa. Takve promene su objašnjene u nastavku.

1. Adriatic Bank je 01.01.2013. godine promenila status iz jednomesečnog u tromesečnog PDV obveznika, ali je 01.01.2018. godine ponovo postala jednomesečni obveznik. Ipak, od 01.04.2019. godine su ponovo bili tromesečni obveznici, da bi od 01.04.2024. godine ponovo bili jednomesečni obveznici. Ovo je banka sa najčešćim promenama PDV statusa i banka koja je poslednja, među uzorkovanim bankama, promenila svoj PDV status.
2. Banka Poštanska Štedionica je 01.01.2013. godine promenila status iz jednomesečnog u tromesečnog PDV obveznika, ali je od 01.04.2017. godine ponovo postala jednomesečni obveznik.

3. Erste Bank je 01.01.2013. godine promenila status iz jednomesečnog u tromesečnog PDV obveznika, ali je od 01.04.2023. godine ponovo postala jednomesečni obveznik.
4. Eurobank Direktna je 01.01.2013. godine promenila status iz jednomesečnog u tromesečnog PDV obveznika, ali je od 01.04.2022. godine ponovo postala jednomesečni obveznik.
5. OTP Banka Srbija je 01.01.2013. godine promenila status iz jednomesečnog u tromesečnog PDV obveznika, ali je od 01.07.2020. godine ponovo postala jednomesečni obveznik.
6. UniCredit Bank Srbija je 01.01.2013. godine promenila status iz jednomesečnog u tromesečnog PDV obveznika, ali je od 01.07.2016. godine ponovo postala jednomesečni obveznik.

Tri banke su osnovane nakon uvođenja PDV sistema u Republici Srbiji. Tako je Bank of China Srbija jednomesečni PDV obveznik od kraja 2016. godine, a Mirabank, takođe, jednomesečni obveznik od početka 2017. godine. API Bank je tokom 2008. godine registrovana kao jednomesečni PDV obveznik, ali je od početka 2013. godine promenila status u tromesečnog PDV obveznika.

Zaključak

Istraživanje u ovom radu je sprovedeno sa namerom da se (bar delimično) popuni gep u literaturi o oporezivanju banaka PDV-om. Prethodna istraživanja o porezima u bankama su se primarno bavila porezom na dobitak, dok je pitanje PDV-a bilo relativno zapostavljeno. Stoga je sprovedeno istraživanje koje je obuhvatilo sve aktivne banke u Republici Srbiji na početku jula 2024. godine, sa ciljem ispitivanja njihovog PDV statusa, ali i uticaja promene poreske regulative na njihov PDV status.

Rezultati empirijskog istraživanja su pokazali da, iako je većina bankarskih aktivnosti oslobođena PDV-a, sve banke u Republici Srbiji su obveznici PDV-a: trinaest banaka je jednomesečni PDV obveznik, dok je sedam banaka tromesečni PDV obveznik. Zapravo, PDV-om su oporezovane samo neke bankarske aktivnosti, poput iznajmljivanja sefova, čuvanja i upravljanja hartijama od vrednosti, naplate potraživanja za druga lica, savetodavnih usluga i slično. Glavni razlog za ovakav nalaz je pronađen u relativno niskom nivou za obaveznu registraciju u PDV sistem, koji u Republici Srbiji iznosi osam miliona dinara prometa.

Dodatno, rezultati istraživanja pokazuju da promene poreske regulative značajno utiču na PDV status banaka u Republici Srbiji. S tim u vezi, promene Zakona o PDV-u (odredaba o utvrđivanju ukupnog prometa za evidentiranje u PDV sistem) na početku 2013. godine su dovele do toga da veliki broj banaka promeni svoj PDV status iz jednomesečnog u tromesečnog PDV obveznika. Pre ovih promena su sve trenutno aktivne banke u Republici Srbiji (koje su bile aktivne i u to vreme) bile jednomesečni PDV obveznici.

Autor veruje da rezultati istraživanja u ovom radu imaju važne mikroekonomske i makroekonomske implikacije na brojne interesne grupe, a primarno na menadžment banaka u Republici Srbiji i kreatore fiskalne politike u Republici Srbiji. Posmatrano sa mikroekonomskog aspekta, menadžment banaka može bolje sagledati svoju PDV poziciju, u smislu ostvarivanja potencijalnih poreskih ušteda. Primera radi, značajan broj banaka u Republici Srbiji ne vrši srazmerni odbitak PDV-a po osnovu nabavki određenih inputa, iako na to ima pravo, čime propušta određene (potencijalno značajne) poreske uštede.

Posmatrano sa makroekonomskog aspekta, kreatori fiskalne politike moraju biti veoma oprezni prilikom implementiranja PDV-a u bankarskom sektoru. Važnu prepreku oporezivanju osnovnih bankarskih aktivnosti PDV-om (ili nekim posebnim porezom na potrošnju) predstavlja činjenica da bi teret ovog

poreza verovatno podneli klijenti banke, a primarno fizička lica. Takođe, kreatori fiskalne politike treba da razmotre povećanje limita za ulazak u PDV sistem, s obzirom na to da je trenutni limit od osam miliona dinara na snazi duže od jedne decenije, a da su u međuvremenu zabeleženi značajni inflatorni trendovi.

Rezultate istraživanja u ovom radu treba posmatrati kroz prizmu određenih ograničenja. Istraživanje je obuhvatilo samo aktivne banke u Republici Srbiji na početku jula 2024. godine. Time su zapostavljene banke koje su bile aktivne u ranijem periodu, a koje više nisu aktivne zbog finansijskih problema, spajanja ili preuzimanja banaka. Takođe, moguće je da bi rezultati istraživanja bili drugačiji da su obuhvaćene banke iz drugih tranzicionih i post-tranzicionih zemalja. Dodatno, usled specifičnosti nacionalnih poreških i bankarskih sistema, rezultati istraživanja ne mogu biti analogno preneti na banke iz ostalih zemalja.

Buduća istraživanja bi mogla obuhvatiti sve banke koje su poslovale u Republici Srbiji od uvođenja PDV-a do momenta uzorkovanja. Takođe, istraživanja bi mogla obuhvatiti i ostale tranzicione i post-tranzicione države u cilju poređenja rezultata. Buduća istraživanja bi, takođe, mogla obuhvatiti ostale finansijske institucije u cilju ispitivanja razlika u PDV statusu banaka i ostalih finansijskih institucija.

Literatura

1. Acosta-Ormaechea, S. & Morozumi, A. (2021). The Value-Added Tax and Growth: Design Matters. *International Tax and Public Finance* 28(1), 1211-1241, doi: 10.1007/s10797-021-09681-2.
2. Baydur, I. & Yilmaz, F. (2021). VAT Treatment of the Financial Services: Implications for the Real Economy. *Journal of Money, Credit and Banking* 53(8), 2167-2200, doi: 10.1111/jmcb.12780.
3. Chiorazzo, V. & Milani, C. (2011). The Impact of Taxation on Bank Profits: Evidence from EU Banks. *Journal of Banking & Finance* 35(12), 3202-3212, doi: 10.1016/j.jbankfin.2011.05.002.
4. Ceponis, P., Kuslys, M. & Sarapovas, T. (2021). The Impact of Bank Tax on Lending Margin. *Engineering Economics* 32(3), 210-220, doi: 10.5755/j01.ee.32.3.27208.
5. Chaudhry, S., Mullineux, A. & Agarwal, N. (2015). Balancing the Regulation and Taxation of Banking. *International Review of Financial Analysis* 42(1), 38-52, doi: 10.1016/j.irfa.2015.01.020.
6. De la Feria, R. & Krever, R. (2012). Ending VAT Exemptions: Towards A Post-Modern VAT. Oxford University Centre for Business Taxation Working Paper No. 1228.
7. De la Feria, R. & Walpole, M. (2009). Options for Taxing Financial Supplies in Value Added Tax: EU VAT and Australian GST Models Compared. *International and Comparative Law Quarterly* 58(1), 897-932, doi: 10.1017/S0020589309001560.
8. Đurđević, A. & Furtula, S. (2023). Convergence of the Banking Sector of the Republic of Serbia in the Conditions of Financial Integration. *Bankarstvo* 52(2-3), 97-126, doi: 10.5937/bankarstvo2302097D.
9. Genser, B. & Winker, P. (1997). Measuring the Fiscal Revenue Loss of VAT Exemption in Commercial Banking. *FinanzArchiv / Public Finance Analysis* 54(4), 563-585.
10. Gholami, A. & Abasinejad, H. (2016). Implementation of Value-Added Tax on Iran Banking Services: An Application of DSGE Model. *Journal of Money and Economy* 11(3), 283-303.
11. Grinberg, I. (2010). Where Credit Is Due: Advantages of the Credit-Invoice Method for a Partial Replacement of VAT. *Tax Law Review* 63(2), 309-358.
12. Hodžić, S. & Celebi, H. (2017). Value-Added Tax and Its Efficiency: EU-28 and Turkey. *UTMS Journal of Economics* 8(2), 79-90, doi:
13. Hoffman, A. (1988). The Application of a Value-Added Tax to Financial Services. *Canadian Tax Journal* 36(5), 1204-1224.

14. Huizinga, H. (2004). The Taxation of Banking in an Integrating Europe. *International Tax and Public Finance* 11(1), 551-568, doi: 10.1023/B:ITAX.0000033992.53339.6c.
15. Keen, M., Krellove, R. & Norregard, J. (2010). The Financial Activities Tax. In Claessens, S. et al. (Eds.), *Financial Sector Taxation: The IMF's Report to the G-20 and Background Material* (pp. 118-143). Washington, DC: International Monetary Fund.
16. Keen, M., Krellove, R. & Norregard, J. (2016). The Financial Activities Tax. *Canadian Tax Journal* 64(2), 389-400.
17. Lazar, S. & Andries, A. (2022). Effective Tax Rates for Bank Entities across European Union. *Economic Research* 35(1), 1581-1603, doi: 10.1080/1331677X.2021.1985565.
18. Lopez-Laborda, J. & Pena, G. (2017). International Practices of Financial VAT. *International VAT Monitor* 28(6), 457-465, doi: 10.59403/3kvzy96.
19. Lopez-Laborda, J. & Pena, G. (2018). A New Method for Applying VAT to Financial Services. *National Tax Journal* 71(1), 155-182, doi: 10.17310/ntj.2018.1.05.
20. Masiukiewicz, P. & Dec, P. (2012). Special Taxes in Banking. *Perspectives of Innovations, Economics & Business* 11(2), 61-68. doi:10.15208/pieb.2012.06.
21. Meeks, G. & Meeks, G. (2014). Why Are Banks Paying So Little UK Corporation Tax? *Fiscal Studies* 35(4), 511-533, doi: 10.1111/j.1475-5890.2014.12040.x.
22. Merz, J. & Overesch, M. (2016). Profit Shifting and Tax Response of Multinational Banks. *Journal of Banking & Finance* 68(1), 57-68. doi:10.1016/j.jbankfin.2016.03.015.
23. Poddar, S. & English, M. (1997). Taxation of Financial Services under a Value-Added Tax: Applying the Cash-Flow Approach. *National Tax Journal* 50(1), 89-111, doi: 10.1086/ntj41789244.
24. Putica, M. (2023). Business and Institutional Determinants of Effective Tax Rates in Serbian Banks. *Economic Horizons* 25(1), 31-48, doi: 10.5937/ekonhor2301035P.
25. Schatan, R. (2003). VAT on Banking Services: Mexico's Experience. *International VAT Monitor* 14(4), 287-294.
26. Schenk, A. (2010). Taxation of Financial Services (Including Insurance) under a US Value-Added Tax. *Tax Law Review* 63(2), 409-442.
27. Sibrtova, V. (2023). Taxation of Financial Institutions in the Czech Republic. *European Financial and Accounting Journal* 18(1), 1-23, doi: 10.18267/j.efaj.278.
28. Todorović, V., Bogićević, J. & Vržina, S. (2019). Income Tax Management in Banks in The Republic of Serbia. *Economic Horizons* 21(3), 195-208, doi: 10.5937/ekonhor1903199T.
29. Vržina, S. (2022). Deferred Income Tax in Multinational Banks: A Case of Croatia, Serbia and Slovenia. *Bankarstvo* 51(3-4), 66-93, doi: 10.5937/bankarstvo2204066V.
30. Vržina, S. (2023). Tax Risk Management in Multinational Banks: A View from Serbia. *Bankarstvo* 52(4), 10-34, doi: 10.5937/bankarstvo2304010V.

Received: 17.08.2024.

Accepted: 17.11.2024.

DOI: 10.5937/bankarstvo2403117V

BANKS AS VALUE-ADDED TAXPAYERS: A CASE OF THE REPUBLIC OF SERBIA

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Summary: Prior research on the taxation of the banking sector were primarily interested in corporate income tax. The issue of taxation of banks with value-added tax (VAT) is relatively neglected. Therefore, this paper examines the VAT status of commercial banks in the Republic of Serbia and the impact of tax regulation changes on their VAT status. In this regard, the research showed that all active banks in the Republic of Serbia are VAT payers: thirteen banks are monthly, while seven are quarterly VAT payers. Although most bank activities are VAT-exempt, some activities such as rental of deposit safe boxes, custody and management of securities, collection of receivables for third parties or consulting services are taxable with VAT at a general rate. Further, a large share of banks changed their status from monthly to quarterly VAT payers after changes in tax regulation regarding the calculation of total turnover for purposes of registration for VAT at the beginning of 2013. In this regard, research results add to the prior research on taxation of banks with VAT, but may also be a useful basis for reforming the system of bank taxation in the future.

Keywords: banks, tax, VAT, tax exemptions, tax regulation.

JEL classification: F38, G21, H25, K34

Introduction

Newspaper headlines announcing bank taxation changes have been frequent in the last decade. In this regard, some countries developed and implemented a special tax for banks, some imposed higher statutory corporate income tax rates to banks than real-sector companies, while some reconsider taxation of banks with value-added tax (VAT). Some of these tax alternatives are well-studied in academic literature, but the issue of VAT in the banking sector is relatively neglected.

In general, the taxation of banks and real-sector companies is based on similar tax regulation. Taxation of profit that banks report and income that banks pay to the persons is conducted in almost similar way as in the real-sector companies (Vržina, 2023). On the other hand, the implementation of VAT in the banking sector is specific compared to real-sector companies, primarily due to the specific features of the banking industry.

The current situation, in which most bank activities are VAT-exempt, is the subject of frequent discussions, both in academic public and everyday practice. Academic views are going from advocating the taxation of all bank activities with VAT (Chaudhry et al., 2015), with arguments that it would positively affect each interest group, to the fear that imposing VAT on bank activities would overburden bank clients, primarily persons (Genser & Winker, 1997). Further, although most bank activities are VAT-exempt, many banks around the world are VAT payers.

The subject of the paper are commercial banks in the Republic of Serbia as VAT payers. Although many studies about commercial banks may be observed in the Republic of Serbia and neighboring developing countries, a small portion of them are interested in bank taxation. In addition, prior research on bank taxation were primarily interested in corporate income tax, both in the world (for instance Meeks & Meeks, 2014; Merz & Overesch, 2016; Lazar & Andries, 2022) and in the Republic of Serbia (for instance Todorović et al., 2019; Vržina, 2022; Putica, 2023).

The paper has two main objectives. The first objective is to examine whether banks in the Republic of Serbia are VAT payers and to examine their VAT status (monthly or quarterly VAT payers). The second objective of the paper is to examine how frequent changes in tax regulation impact the VAT status of banks in the Republic of Serbia. Changes in tax regulation in the Republic of Serbia are relatively frequent, reflecting the aspirations to continuously harmonize tax regulation with the regulation of the European Union.

Research in this paper adds to the prior research in the field of bank taxation, both on an international level (since the VAT system is implemented in most countries around the world) and at the level of the Republic of Serbia. In particular, this research adds to the scarce prior research on the taxation of banks with VAT. To the author's best knowledge, this is the first research about the taxation of banks with VAT in the Republic of Serbia. In fact, even in developed European countries, the amount of research on VAT in banks is relatively small (for instance Huizinga, 2004; De la Feria & Walpole, 2009; Baydur & Yilmaz, 2021).

Aside from the introduction and conclusion, the paper has three parts. The first part gives a theoretical background about the taxation of banks with VAT. The second part provides a review of the implementation of VAT regulation in banks in the Republic of Serbia. The third part presents the empirical research on VAT in banks in the Republic of Serbia.

1. Theoretical Background

VAT is considered to be the most developed general consumption tax. It was developed in the second part of the twentieth century, first implemented in some developed countries (Denmark, France and Germany) and today is implemented in each European country and most of the world (Acosta-Oramechea & Morozumi, 2021). The main advantage of the VAT system may be found in the credit-invoice system (as the VAT model that is adopted by most countries), enabling the VAT payer that buys to deduct VAT calculated by the VAT payer that sells (Grinberg, 2010). In this way, participants in transaction control each other, thus minimizing the role of government administration.

On the other hand, taxation of banks and other financial institutions is one of the most controversial issues in modern tax systems. Theoretical and real-world discussions often argue that banks should be additionally taxed. In addition, banks are often the first type of legal entity that is burdened with additional taxes – for instance, in economic crisis circumstances (such as the crisis brought by the Covid-19 virus) to enhance government revenue (Sibrtova, 2023).

In the VAT context, a consensus about how banks should be taxed with this tax type is yet to be reached. In the past, there were many attempts to significantly tax banks with VAT (Lopez-Laborda & Pena, 2018) or similar multi-stage consumption tax (Hoffman, 1988), but the international-level consensus on this issue has not been reached. Fiscal policymakers have to be careful with the implementation of VAT on core bank activities, balancing between specific features of the banking industry (for which VAT was not originally intended) and the importance of the banking sector for the economy (Schenk, 2010).

Currently, banks are exempt from calculating and paying VAT on most activities in the majority of countries around the world, including European Union countries (Poddar & English, 1997; Baydur & Yilmaz, 2021). Such consensus is reached in the second part of the twentieth century in the European Union, partially due to the complexity of the banking industry and the complexity of potential taxation of banks with VAT (Huizinga, 2004). In this regard, Poddar & English (1997) argue that the financial sector is one of the hardest sectors for the implementation of VAT. On the other hand, certain banking services are taxed with VAT in most countries. In this regard, Huizinga (2004) points out the rental of deposit safe boxes or consulting services that banks offer.

Regarding tax revenue of the government, Baydur & Yilmaz (2021) showed that the implementation of VAT on core bank activities (active, passive and neutral operations) would undoubtedly increase government tax revenue. Further, the implementation of VAT would eliminate important distortions and inefficiencies brought by the VAT-exemption of the bank activities (Gholami & Abasinejad, 2016). However, a significant concern in this regard may be found in the reactions of the banking sector to such implementation of VAT. In this regard, prior research primarily studied the effects of VAT implementation (on certain bank activities) on the price of bank services. In other words, it is studied whether banks would be able to shift their VAT burden on their clients. Some research from the last two decades in Europe (for instance Masiukiewicz & Dec, 2012; Ceponis et al., 2021) show that banks can fully shift a specific tax burden imposed only on banks that depends on the value of their total assets (bank tax) to their customers through the increase of prices. In addition, Chiorazzo & Milani (2011) show that banks can fully shift their VAT burden to their clients.

Genser & Winker (1997) argue that different types of bank clients would not be burdened to the same extent if the scope of bank activities taxed with VAT is widened. In fact, they argue that legal entities (as bank clients) would be burdened with VAT to a lower extent, as they can deduct such VAT. However,

this holds only assuming that legal entities are VAT payers. On the other hand, individuals would be burdened with VAT to a higher extent as they would have to pay a higher price for bank services without additional benefits.

Furthermore, some theoretical arguments (for instance Huizinga, 2004) note that the implementation of VAT should be conducted only on financial transactions between banks and persons (as bank clients). On the other hand, VAT should not even be calculated on financial transactions between banks and legal entities, since the legal entities would deduct such VAT. Such an approach would require banks, *inter alia*, to have different prices of bank services for legal entities and persons and to clearly classify their clients on legal entities and persons which may be, from the tax aspect, doubtful in some cases – for instance in a case of sole entrepreneurs that are persons but perform certain economic activity.

The current situation, in which most bank activities are VAT-exempt, may put even banks in an unfavorable position to a certain extent (Huizinga, 2004). In particular, this regards banks that operate in countries with relatively high general VAT rates. In this regard, Hodžić & Celebi (2017) show that general VAT rates are significantly different across countries. When general VAT rates are relatively high, banks pay relatively high prices with VAT for bought inputs. On the other hand, banks are usually not able to deduct such high VAT as activities for which inputs are bought are VAT-exempt. In this way, banks that operate in countries with relatively lower general VAT rates have, at the international level, a competitive advantage compared to banks that operate in countries with relatively higher general VAT rates.

Considering the advantages and weaknesses of VAT-exemption of bank activities, numerous countries implemented certain systems to mitigate weaknesses of such (non-)taxation. A good review of such alternative systems is given by Lopez-Laborda & Pena (2017). Some of such systems that enable banks to (at least partially) deduct VAT on bought inputs are (Schatan, 2003; De la Feria & Walpole, 2009):

- zero rate method, in which VAT is not calculated on bank activities, but banks are allowed to deduct VAT on bought inputs;
- exemption with partial input credits, in which VAT is not calculated on core bank activities, but banks are allowed to partially deduct VAT on bought inputs;
- taxation of fees and commissions, in which banks are required to calculate VAT on fees and commissions that may be explicitly identified, while banks are allowed to deduct VAT on bought inputs and
- option to tax, in which banks may choose to calculate VAT only on fees and commissions or even on net interest margin (difference between interest revenue and interest expenses).
- Some countries implemented systems that tax banks with VAT based on reported financial performance (Keen et al., 2010; De la Feria & Krever, 2012). Under such methods, banks are not allowed to deduct any VAT on bought inputs. For instance, such systems are:
 - net operating income method, in which banks calculate and pay VAT on net operating income reported for a certain period;
 - addition method, in which a base for VAT is calculated as a sum of payroll costs, rent costs, interest expenses and net income and
 - subtraction method, in which a base for VAT is calculated as a difference between revenue and purchases of a bank.

Further, some countries developed and implemented a fully new consumption tax that is significantly different from the usual VAT (Keen et al., 2016). However, most developed countries, particularly European ones, implement tax exemption for most bank activities, while banks are allowed to deduct VAT on bought inputs only to the extent to which bought inputs are used for activities that are taxable with VAT.

2. VAT in Banks in the Republic of Serbia

The implementation of the VAT system in the Republic of Serbia started on 1 January 2005, based on the VAT Law adopted in 2004. In this way, the Republic of Serbia became one of the latest European countries to implement VAT as a general consumption tax. In line with VAT Law, certain bylaws are also implemented in the Republic of Serbia. The same VAT regulation is imposed on both real-sector companies and commercial banks.

The general VAT rate in the Republic of Serbia is currently 20%. In addition, a reduced VAT rate of 10% is also implemented, on certain goods and services, primarily essential ones. In line with VAT Law, VAT payers may be registered as monthly or quarterly (three-monthly) taxpayers and the deadline to submit tax return and pay VAT is fifteen days after the tax period (month or quarter).

Like for other entities, a threshold of eight million dinars for mandatory registration for VAT also holds for banks. In other words, banks that reported turnover higher than this threshold in the last twelve months are required to register with the VAT system. Banks with a turnover lower than eight million dinars may voluntarily register with the VAT system. Further, banks with a turnover higher than fifty million dinars in the last twelve months are required to register as monthly VAT payers.

A highly important issue, particularly for banks, is a definition of turnover that enters the threshold of eight million dinars for purposes of registration in the VAT system. In this regard, the following types of turnover may be identified:

- turnover taxable with VAT;
- VAT-exempt turnover with the right to a preliminary tax deduction (in line with article 24 of VAT Law) and
- VAT-exempt turnover without the right to a preliminary tax deduction (in line with article 25 of VAT Law).

A threshold of eight million dinars includes only turnover taxable with VAT and VAT-exempt turnover with the right to a preliminary tax deduction, though the trade of goods and services that is done in a foreign country should be excluded. On the other hand, core bank activities (loans, deposits and payments processing) belong to the VAT-exempt turnover without the right to a preliminary tax deduction, implying that most of the bank turnover should not be included in a threshold for registration in the VAT system.

Regarding the loans that banks approve, such loans are VAT-exempt. In addition, almost all activities related to loan approval are VAT-exempt, such as processing and realization of loan requests (as it is considered an accessory providing services for loan approval), intermediation in loan transactions, assessment of creditworthiness by banks etc. On the other hand, when a bank requires a report on the creditworthiness of legal entities and persons from the Association of Serbian Banks (ASB), the ASB is required to calculate VAT, while the bank is not allowed to deduct such VAT.

In addition, as with loan activities, deposit activities of banks are VAT-exempt. Regarding payment processing, all services that banks offer to enable payment processing are VAT-exempt without the right to a preliminary tax deduction, in line with article 25 of VAT Law. In other words, fees for taking cash from a current account and transfers from one current account to another are VAT-exempt. Further, fees that are collected for the issuance of debit and credit cards are VAT-exempt.

Rules on main and accessory delivery are applied for certain payment processing services. For instance, the services of opening, managing and maintaining accounts are VAT-exempt as well as the preparation of reports and similar documents about the balance and transactions of the account. However, certain additional services to opening the current account are often contracted, such as sending notifications or reports through SMS messages or e-mail. In this regard, if such additional services are contracted separately, they would be taxable with VAT. However, when they are contracted together with the main service of opening the current account, they are VAT-exempt as they are considered as accessory delivery for the main delivery (that is VAT-exempt).

On the other hand, certain activities that are only indirectly connected with payment processing services are not VAT-exempt. For instance, when a bank rents a space for automated teller machines (ATM) or purchases services of software support for ATMs, a supplier of such services is required to calculate VAT at a rate of 20% (if a supplier is VAT payer), while bank is not allowed to deduct VAT from such activities.

Although most bank activities are VAT-exempt (without the right to preliminary tax deduction), some important bank activities that are taxable with VAT (and for which a bank is allowed to deduct VAT) may be identified. Such activities are, for instance, the rental of deposit safe boxes, custody and management of securities and collection of receivables for third parties. In addition, when banks register a loan with the National Bank of Serbia (that is approved by a non-resident to a resident party), they are required to calculate VAT at a rate of 20%. Further, bank activities that are also usual for real-sector companies (such as asset renting, selling of equipment or consulting services) are taxable with VAT.

Certain purchases by banks are used for both VAT-exempt turnover (without the right to preliminary tax deduction) and turnover taxable with VAT. It implies that for such purchases a bank should be allowed to partially deduct VAT (to the extent to which the purchase will be used for taxable turnover). For instance, a bank may receive an invoice for video surveillance of both deposit safe boxes and the loan department. Bank is allowed to deduct VAT for the deposit safe boxes, but is not allowed to deduct it for the loan department. In such circumstances, banks divide preliminary VAT according to the economic association.

VAT division according to the economic association is conducted in line with criteria defined by a bank. For instance, the division of VAT related to video surveillance may be conducted using a number of square meters that video surveillance monitors. In this regard, if video surveillance monitors ten square meters of a room with deposit safe boxes and forty square meters of loan department, a bank should be allowed to deduct 20% of VAT calculated in an invoice for video surveillance.

If a VAT division according to the economic association is not possible, banks may conduct proportionate tax deduction in line with VAT Law. The percentage in which a bank may deduct VAT is calculated after dividing the turnover of goods and services (without VAT) that allows VAT deduction and the total turnover of goods and services (without VAT), measured from the 1 January of the current year until the end of the fiscal period for which a tax return is filed. However, real-world experiences show that many banks do neither VAT division according to the economic association nor proportionate tax deduction, due to the complexity of calculation, thus missing an opportunity to deduct VAT on certain purchases.

3. Empirical Research

3.1. Research Methodology

Empirical research captured each commercial bank in the Republic of Serbia with a work permit and active on 1 July 2024. Twenty such banks are identified, as presented in Table 1. In general, the banking market of the Republic of Serbia is in a process of continuous consolidation with an important decrease in the number of banks – for instance, thirty banks operated in the Republic of Serbia at the end of 2016 (Đurđević & Furtula, 2023). In addition, changes in ownership structures of banks and bank names are frequent. The last change of name happened in May 2024 when Mobi Bank changed its name to Yettel Bank.

Table 1 - List of Sampled Banks

No.	Bank name	TIN	No.	Bank name	TIN
1	3 Bank	101643574	11	Halkbank	100895809
2	Addiko Bank	100228215	12	Mirabank	108851504
3	Adriatic Bank	100003148	13	NLB Komercijalna Bank	100001931
4	AIK Bank	100618836	14	OTP Bank Serbia	100584604
5	ALTA Bank	100001829	15	Postal Savings Bank	100002549
6	API Bank	105701111	16	Procredit Bank	100000215
7	Banca Intesa	100001159	17	Raiffeisen Bank	100000299
8	Bank of China Serbia	109837136	18	Srpska Bank	100000387
9	Erste Bank	101626723	19	UniCredit Bank Serbia	100000170
10	Eurobank Direktna	100002532	20	Yettel Bank	100000049

Note: TIN stands for the tax identification number of a bank.

The VAT status of sampled banks is examined using the publicly accessible data of the Tax Administration of the Republic of Serbia. In fact, at its official website is possible to access the TIN register (www.purs.gov.rs/pib.html) and to check whether a certain legal entity is a VAT payer, whether it is a monthly or quarterly payer, when it is registered in the VAT system as well as whether it changed its VAT status from monthly to quarterly VAT payer and vice versa. The VAT status of sampled banks was examined on 1 July 2024.

3.2. Research Results

Table 2 presents the VAT status for each active bank in the Republic of Serbia. It may be noted that each bank is a VAT payer. In this regard, more banks are monthly VAT payers (thirteen) than quarterly VAT payers (seven). It implies that each bank in the Republic of Serbia reached the threshold of eight million

dinars of turnover in the last twelve months or voluntarily decided to be registered in the VAT system.

Table 2 - VAT Status of Banks in the Republic of Serbia

No.	Bank name	VAT payer	Type of taxpayer	Date of VAT registration
1	3 Bank	Yes	Quarterly	29.09.2004
2	Addiko Bank	Yes	Monthly	29.09.2004
3	Adriatic Bank	Yes	Monthly	27.09.2004
4	AIK Bank	Yes	Monthly	30.09.2004
5	ALTA Bank	Yes	Quarterly	29.09.2004
6	API Bank	Yes	Quarterly	03.09.2008
7	Banca Intesa	Yes	Monthly	22.09.2004
8	Bank of China Serbia	Yes	Monthly	22.12.2016
9	Erste Bank	Yes	Monthly	23.09.2004
10	Eurobank Direktna	Yes	Monthly	09.09.2004
11	Halkbank	Yes	Quarterly	29.09.2004
12	Mirabank	Yes	Monthly	01.01.2017
13	NLB Komercijalna Bank	Yes	Monthly	23.09.2004
14	OTP Bank Serbia	Yes	Monthly	28.09.2004
15	Postal Savings Bank	Yes	Monthly	20.09.2004
16	Procredit Bank	Yes	Quarterly	24.09.2004
17	Raiffeisen Bank	Yes	Monthly	29.09.2004
18	Srpska Bank	Yes	Quarterly	29.09.2004
19	UniCredit Bank Serbia	Yes	Monthly	30.09.2004
20	Yettel Bank	Yes	Quarterly	01.09.2004

Such findings for banks are different compared to some other financial institutions in the Republic of Serbia. In this regard, some insurance companies that are not VAT payers may be identified in the Republic of Serbia. For instance, OTP Insurance, Sogaz Insurance and Sava Life Insurance are not VAT payers in the Republic of Serbia.

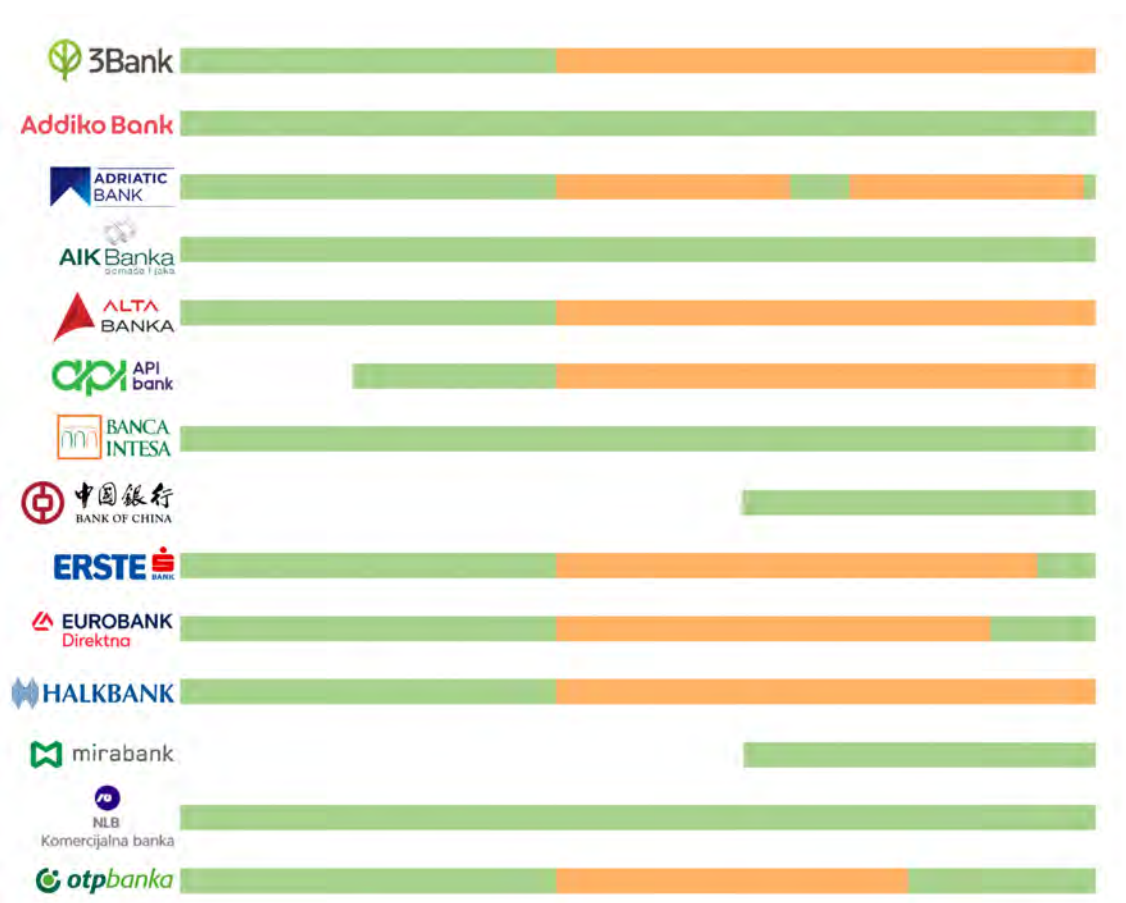
It is interesting to note that every bank in the Republic of Serbia is a VAT payer, although most of the bank activities are VAT-exempt. One of the reasons for such a finding may be found in the relatively low threshold for registering in the VAT system of only eight million dinars. Such a threshold was imposed at the beginning of 2013, when it was increased from four million to eight million dinars. However, since then significant yearly inflation rates were recorded in the Republic of Serbia (particularly during the economic crisis brought on by the Covid-19 pandemic) that led to an increase in bank prices. On the other hand, the limit for registration in the VAT system has not changed, so banks (with the increase in prices) easily reached such a limit.

In addition, it is important to note that only seven banks (Addiko Bank, AIK Bank, Banca Intesa, Bank of China Serbia, Mirabank, NLB Komercijalna Bank and Raiffeisen Bank) did not change their VAT status, as they have been monthly VAT payers since they registered in the VAT system. Other banks changed their status from monthly to quarterly VAT payers and vice versa. Such changes are illustrated in Figure 1.

Regarding the taxation of banks with VAT in the Republic of Serbia, probably the most important date was 1 January 2013, when as many as thirteen sampled banks changed status from monthly to quarterly VAT payer. Before this date, each sampled bank was a monthly VAT payer. Such change at the beginning of 2013 may be explained by the changes in VAT Law that entered into force on 1 January 2013.

In fact, from 1 January 2013, turnover from article 25 of VAT Law (that is VAT-exempt without the right to preliminary tax deduction) should not be included in the threshold of eight million dinars for purposes of registration in the VAT system. This change enabled many legal entities to withdraw from the VAT system. However, such legal entities were still allowed to be voluntarily registered for VAT. In the context of banks, since turnover from article 25 of VAT Law is the core activity of the banks, such changes in VAT Law enabled many banks to reduce total revenue for purposes of registration in the VAT system. However, no bank was able (or did not want) to withdraw from the VAT system, but the majority of banks changed their status from monthly to quarterly VAT payers.

Figure 1 - The VAT Status of Banks in the Republic of Serbia in the Period Between 2005 and 2024





Changes in tax regulation brought certain benefits to many banks (that changed their VAT status to quarterly VAT payer). In fact, these banks have fewer administrative requirements regarding VAT as they calculate and pay VAT four times per year instead of twelve times in the case of monthly taxpayers. Further, a change to the quarterly VAT taxpayer may increase bank liquidity as they may use funds that should be paid to the government as tax over a longer period. For instance, the first deadline for payment of VAT in a calendar year for monthly taxpayers is 15 February, while the first deadline for quarterly taxpayers is 15 April.

Certain sampled banks have changed their VAT status multiple times since 2013 – from monthly taxpayer to quarterly and vice versa. Such changes are primarily a result of changes in the total turnover of banks (above or below fifty million dinars, as it is a threshold for monthly taxpayers) for purposes of determining their VAT status. These changes are explained in the following.

1. Adriatic Bank changed its status from monthly to quarterly VAT payer on 1 January 2013, but became a monthly again taxpayer on 1 January 2018. However, from 1 April 2019, it was again a quarterly taxpayer, and from 1 April 2024 again a monthly taxpayer. This is the bank with the most frequent changes in VAT status and the last bank, among sampled banks, to change its VAT status.
2. Erste Bank changed its status from monthly to quarterly VAT payer on 1 January 2013, but became a monthly taxpayer again on 1 April 2023.
3. Eurobank Direktna changed its status from monthly to quarterly VAT payer on 1 January 2013, but became a monthly taxpayer again on 1 April 2022.
4. OTP Bank Serbia changed its status from monthly to quarterly VAT payer on 1 January 2013, but became a monthly taxpayer again on 1 July 2020.
5. Postal Saving Bank changed its status from monthly to quarterly VAT payer on 1 January 2013, but became a monthly taxpayer again on 1 April 2017.
6. UniCredit Bank Serbia changed its status from monthly to quarterly VAT payer on 1 January 2013, but became a monthly taxpayer again on 1 July 2016.

Three banks were founded after the implementation of the VAT system in the Republic of Serbia. In this regard, Bank of China Serbia has been a monthly VAT payer since the end of 2016, while Mirabank has been a monthly VAT payer since the beginning of 2017. API Bank was registered as a monthly VAT payer in 2008, but changed status to a quarterly VAT payer at the beginning of 2013.

Conclusion

Research in this paper aimed to (at least partially) fill the gap in the literature about the taxation of banks with VAT. Prior research about taxes in banks were primarily interested in corporate income tax, while the issue of VAT was relatively neglected. Therefore, the research that captures all active banks in the Republic of Serbia at the beginning of July 2024 is conducted, aiming to examine their VAT status and the impact of changes in tax regulation on their VAT status.

Results of empirical research showed that, although a majority of bank activities are VAT-exempt, each bank in the Republic of Serbia is a VAT payer: thirteen banks are monthly VAT payers, while seven banks are quarterly VAT payers. In fact, only certain bank activities are taxed with VAT, such as the rental of deposit safe boxes, custody and management of securities, collection of receivables for third parties, consulting services etc. The main reason for such a finding may be found in the relatively low threshold for mandatory registration in the VAT system in the Republic of Serbia of only eight million dinars of turnover.

In addition, research results show that changes in tax regulation significantly impact the VAT status of banks in the Republic of Serbia. In this regard, due to changes in VAT Law (about the calculation of total turnover for registration in the VAT system) at the beginning of 2013, many banks changed their VAT status from monthly to quarterly VAT payers. Before this change, each currently active bank in the Republic of Serbia (that was also active at that time) was a monthly VAT payer.

The author believes that the research results in this paper have important microeconomic and macroeconomic implications for various interest groups, primarily on the management of banks in the Republic of Serbia and fiscal policymakers in the Republic of Serbia. From the microeconomic aspect, the management of banks may better analyze their VAT position in terms of achieving potential tax savings. For instance, many banks in the Republic of Serbia do not conduct proportional tax deduction for the purchase of certain inputs, although they are allowed to, thus missing certain (potentially significant) tax savings.

From the macroeconomic aspect, fiscal policymakers should be highly careful while implementing VAT in the banking sector. An important obstacle to tax core bank activities with VAT (or some special consumption tax) lies in the fact that such tax would be probably borne by bank clients, primarily persons. Further, fiscal policymakers should consider increasing the threshold for registration in the VAT system, as the current limit of eight million dinars was imposed more than a decade ago, while significant inflation trends have been recorded in the meantime.

Research results from this paper should be considered under the prism of certain limitations. Research captured only active banks in the Republic of Serbia at the beginning of July 2024. In this way, banks that were active in the past year and that are not currently active due to financial difficulties, mergers or acquisitions are neglected. Further, it is possible that research results would be different if banks from other transition and post-transition countries were sampled. In addition, due to cross-national differences in tax and banking systems, research results should not be analogously implemented on banks from other countries.

Future research may capture all banks that operated in the Republic of Serbia from the VAT implementation to the sampling moment. In addition, research may also capture other transition and post-transition countries to compare results. Future research may also capture other financial institutions to examine the differences in VAT status between banks and other financial institutions.

References

1. Acosta-Ormaechea, S. & Morozumi, A. (2021). The Value-Added Tax and Growth: Design Matters. *International Tax and Public Finance* 28(1), 1211-1241, doi: 10.1007/s10797-021-09681-2.
2. Baydur, I. & Yilmaz, F. (2021). VAT Treatment of the Financial Services: Implications for the Real Economy. *Journal of Money, Credit and Banking* 53(8), 2167-2200, doi: 10.1111/jmcb.12780.
3. Chiorazzo, V. & Milani, C. (2011). The Impact of Taxation on Bank Profits: Evidence from EU Banks. *Journal of Banking & Finance* 35(12), 3202-3212, doi: 10.1016/j.jbankfin.2011.05.002.
4. Ceponis, P., Kuslys, M. & Sarapovas, T. (2021). The Impact of Bank Tax on Lending Margin. *Engineering Economics* 32(3), 210-220, doi: 10.5755/j01.ee.32.3.27208.
5. Chaudhry, S., Mullineux, A. & Agarwal, N. (2015). Balancing the Regulation and Taxation of Banking. *International Review of Financial Analysis* 42(1), 38-52, doi: 10.1016/j.irfa.2015.01.020.
6. De la Feria, R. & Krever, R. (2012). Ending VAT Exemptions: Towards A Post-Modern VAT. Oxford University Centre for Business Taxation Working Paper No. 1228.
7. De la Feria, R. & Walpole, M. (2009). Options for Taxing Financial Supplies in Value Added Tax: EU VAT and Australian GST Models Compared. *International and Comparative Law Quarterly* 58(1), 897-932, doi: 10.1017/S0020589309001560.
8. Đurđević, A. & Furtula, S. (2023). Convergence of the Banking Sector of the Republic of Serbia in the Conditions of Financial Integration. *Bankarstvo* 52(2-3), 97-126, doi: 10.5937/bankarstvo2302097D.
9. Genser, B. & Winker, P. (1997). Measuring the Fiscal Revenue Loss of VAT Exemption in Commercial Banking. *FinanzArchiv / Public Finance Analysis* 54(4), 563-585.
10. Gholami, A. & Abasinejad, H. (2016). Implementation of Value-Added Tax on Iran Banking Services: An Application of DSGE Model. *Journal of Money and Economy* 11(3), 283-303.
11. Grinberg, I. (2010). Where Credit Is Due: Advantages of the Credit-Invoice Method for a Partial Replacement of VAT. *Tax Law Review* 63(2), 309-358.
12. Hodžić, S. & Celebi, H. (2017). Value-Added Tax and Its Efficiency: EU-28 and Turkey. *UTMS Journal of Economics* 8(2), 79-90, doi:
13. Hoffman, A. (1988). The Application of a Value-Added Tax to Financial Services. *Canadian Tax Journal* 36(5), 1204-1224.
14. Huizinga, H. (2004). The Taxation of Banking in an Integrating Europe. *International Tax and Public Finance* 11(1), 551-568, doi: 10.1023/B:ITAX.0000033992.53339.6c.
15. Keen, M., Krellove, R. & Norregard, J. (2010). The Financial Activities Tax. In Claessens, S. et al. (Eds.), *Financial Sector Taxation: The IMF's Report to the G-20 and Background Material* (pp. 118-143).

Washington, DC: International Monetary Fund.

16. Keen, M., Krellove, R. & Norregard, J. (2016). The Financial Activities Tax. *Canadian Tax Journal* 64(2), 389-400.
17. Lazar, S. & Andries, A. (2022). Effective Tax Rates for Bank Entities across European Union. *Economic Research* 35(1), 1581-1603, doi: 10.1080/1331677X.2021.1985565.
18. Lopez-Laborda, J. & Pena, G. (2017). International Practices of Financial VAT. *International VAT Monitor* 28(6), 457-465, doi: 10.59403/3kvzy96.
19. Lopez-Laborda, J. & Pena, G. (2018). A New Method for Applying VAT to Financial Services. *National Tax Journal* 71(1), 155-182, doi: 10.17310/ntj.2018.1.05.
20. Masiukiewicz, P. & Dec, P. (2012). Special Taxes in Banking. *Perspectives of Innovations, Economics & Business* 11(2), 61-68. doi:10.15208/pieb.2012.06.
21. Meeks, G. & Meeks, G. (2014). Why Are Banks Paying So Little UK Corporation Tax? *Fiscal Studies* 35(4), 511-533, doi: 10.1111/j.1475-5890.2014.12040.x.
22. Merz, J. & Overesch, M. (2016). Profit Shifting and Tax Response of Multinational Banks. *Journal of Banking & Finance* 68(1), 57-68. doi:10.1016/j.jbankfin.2016.03.015.
23. Poddar, S. & English, M. (1997). Taxation of Financial Services under a Value-Added Tax: Applying the Cash-Flow Approach. *National Tax Journal* 50(1), 89-111, doi: 10.1086/ntj41789244.
24. Putica, M. (2023). Business and Institutional Determinants of Effective Tax Rates in Serbian Banks. *Economic Horizons* 25(1), 31-48, doi: 10.5937/ekonhor2301035P.
25. Schatan, R. (2003). VAT on Banking Services: Mexico's Experience. *International VAT Monitor* 14(4), 287-294.
26. Schenk, A. (2010). Taxation of Financial Services (Including Insurance) under a US Value-Added Tax. *Tax Law Review* 63(2), 409-442.
27. Sibrtova, V. (2023). Taxation of Financial Institutions in the Czech Republic. *European Financial and Accounting Journal* 18(1), 1-23, doi: 10.18267/j.efaj.278.
28. Todorović, V., Bogićević, J. & Vržina, S. (2019). Income Tax Management in Banks in The Republic of Serbia. *Economic Horizons* 21(3), 195-208, doi: 10.5937/ekonhor1903199T.
29. Vržina, S. (2022). Deferred Income Tax in Multinational Banks: A Case of Croatia, Serbia and Slovenia. *Bankarstvo* 51(3-4), 66-93, doi: 10.5937/bankarstvo2204066V.
30. Vržina, S. (2023). Tax Risk Management in Multinational Banks: A View from Serbia. *Bankarstvo* 52(4), 10-34, doi: 10.5937/bankarstvo2304010V.

Udruženje banaka Srbije

BANKARSTVO

2-3/2024

ISSN 2466-5495 | COBISS.SR-ID 109903884



Datum prijema: 19.09.2024. god.
Datum prihvatanja: 24.11.2024. god.

DOI: 10.5937/bankarstvo2403144A

PROCENA PROFITABILNOSTI ODABRANIH OSIGURAVAJUĆIH DRUŠTAVA: SLUČAJ REPUBLIKE SRBIJE

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Rezime: Ovaj rad imao je za cilj da ispita specifične faktore koji utiču i imaju prognostičku snagu na profitabilnost odabranih osiguravajućih društava u Republici Srbiji. Panel podaci su korišćeni za četiri osiguravajuća društva koje posluju u Republici Srbiji za period od 2013. do 2022. godine, da bi se procenio linearni model između determinanti za koje se teoretski očekuje da utiču na performanse i profitabilnost osiguravajućih društava. Nalazi u radu su otkrili da veličina kompanije po sva tri metoda (metod najmanjih kvadrata, metod potpuno modifikovanih najmanjih kvadrata i robusni metod najmanjih kvadrata) ima značajno pozitivan uticaj na profitabilnost osiguravajućih društava. Takođe, i stopa rasta premije po metodi potpuno modifikovanih najmanjih kvadrata ima pozitivan (signifikantan) uticaj na indikator profitabilnosti tj. ROA. Posmatrano sa druge strane, najslabiji tj. negativan (signifikantan) uticaj na profitabilnost poslovanja osiguravajućih društava u Republici Srbiji je ostvarila nezavisna varijabla racio troškova.

Ključne reči: Osiguravajuća društva, profitabilnost, veličina kompanije, leveridž, panel regresiona analiza.

JEL klasifikacija: G22, L25, G23

1. Uvodna razmatranja

Osiguranje već godinama pruža zaštitu ljudima od šteta usled neželjenih događaja kao što su poplava, požar, saobraćajna nesreća, zemljotres ili nevreme. Ljudi prenose rizike koji proizilaze iz neželjenih događaja na osiguravajuća društva u zamenu za premije. Osiguravajuća društva stvaraju grupe kroz prikupljene premije, te obeštećuju ljude izložene neželjenim događajima iz ovih fondova. Osiguranje je zbog svojih funkcija veoma efikasan način prenosa rizika. Plaćanjem pristupačnih premija ljudi ublažavaju negativne efekte neželjenih događaja putem osiguranja. Na ovaj način osiguranje praktično tera ljude da se oslobode strepnje, i hrabrije prave planove. Takođe, osiguranje pomaže preduzetnicima da razviju nove poslove dajući sigurnost. Stvaranjem ogromnih sredstava putem premija i njihovim kanalisanjem kroz finansijska tržišta, osiguranje finansira one subjekte kojima su potrebna sredstva za otvaranje novih ili proširenje postojećeg poslovanja. Kao rezultat toga, sektor osiguranja doprinosi ekonomskom rastu i blagostanju (Kaya, 2015).

Na kraju 2022. godine, u Republici Srbiji poslovalo je ukupno 20 društava za (re)osiguranje, što predstavlja isti broj kao i u 2021. godini. Od datog broja poslovima osiguranja bavilo se 16 društava, dok poslovima reosiguranja samo 4 društva. Takođe, u 2022. godini, društva za osiguranje ostvarila su ukupnu premiju u visini od oko 1,1 milijardu evra, što predstavlja relativno povećanje od 12,2% u odnosu na prethodnu godinu (Narodna banka Srbije, 2022). Sektor osiguranja u Republici Srbiji se po stepenu razvijenosti nalazi znatno ispod proseka zemalja članica Evropske Unije. Učešće sektora osiguranja u ukupnoj bilansnoj sumi finansijskog sektora Srbije iznosi oko 6% (Narodna banka Srbije, 2021).

Profitabilnost se stalno koristi kao mera finansijskog učinka. Ona pokazuje koliko je kompanija dobro poslovala finansijski u prethodnim periodima i daje uvid u budućnost kompanije. Potencijalni investitori, zajmodavci, sadašnji akcionari, klijenti, regulatori i menadžment imaju koristi od profitabilnosti u svojim analizama o kompaniji. Iz navedenih razloga i svog značaja, profitabilnost osiguravajućih društava poslednjih godina privlači pažnju istraživača. Postoje različite mere kao indikatori profitabilnosti kao što su povrat na uložena sredstva (ROA), prinos na kapital (ROE), tehnički koeficijent profitabilnosti, profitna marža, prinos na uloženi kapital (ROIC), ekonomska dodata vrednost (EVA). Sve ove navedene mere su važni indikatori profitabilnosti koje koriste različite zainteresovane strane. U studijama se najčešće koristi ROA kao indikator profitabilnosti jer ga je lako dobiti i nije teško izračunati.

Pregled literature o profitabilnosti srpskog sektora osiguranja pokazao je da ne postoji značajan broj studija o ovom pitanju uprkos njegovoj važnosti. Cilj ovog istraživanja je da se ispituju određeni specifični faktori koji utiču na profitabilnost odabranih osiguravajućih društava u Republici Srbiji. Posmatrani faktori kao nezavisne varijable se ispituju zato što su specifični i svojstveni sektoru osiguranja sa jedne strane, a s druge strane, imaju određeni prediktivni uticaj na indikator profitabilnosti tj. povrat na aktivu odabranih osiguravajućih društava. Verujemo da će otkrivanje ovih faktora pomoći menadžerima osiguravača, investitorima, regulatorima i potencijalnim osiguranicima u donošenju odluka. U tu svrhu, ovaj rad traži odgovor na pitanje: *Koji faktori utiču na profitabilnost odabranih osiguravajućih društava u Republici Srbiji?*

Rad je dizajniran iz pet delova. Prvi deo odnosi se na uvodna razmatranja sa fokusom na važnost tržišta osiguranja, cilj istraživanja i postavljena pitanja u kontekstu profitabilnosti poslovanja odabranih osiguravajućih društava. Drugi deo opisuje pregled relevantnih istraživanja u kontekstu uticaja različitih

faktora na indikatore profitabilnosti osiguravajućih društava, te postavljene istraživačke hipoteze. Treći deo analizira odabrane indikatore sektora osiguranja u Republici Srbiji sa osvrtom na zemlje u okruženju, zemlje članice EU i razvijene zemlje. Četvrti deo opisuje izabranu metodologiju istraživanja i potrebne podatke. Peti deo predstavlja dobijene rezultate istraživanja, kao i određena zapažanja i preporuke.

2. Pregled relevantne literature

Cummins i Nini (2002) su analizirali determinante performansi sektora osiguranja SAD za period od 1993. do 1998. godine. Empirijski nalazi su uključili regresiju performansi kapitalizacije te nekoliko drugih kontrolnih varijabli uključujući i liniju poslovanja odnosno diversifikaciju. Autori su došli do zaključka da veličina preduzeća ima značajan uticaj na prinos na sredstva (ROA), što se objašnjava na način da se generiše veći profit od strane većih kompanija.

Adams i Buckles (2003) su ispitivali determinante operativnog učinka u sektoru osiguranja u Bermudi za period: 1993. – 1997., uzimajući u razmatranje 47 osiguravajućih društava. Nalazi istraživanja su pokazali da društva sa visokom polugom i niskom likvidnošću imaju najbolje operativne performanse. Štaviše, veličina kompanije i obim aktivnosti nemaju suštinskog uticaja na performanse osiguravajućih društava.

Studija koju je sproveo Shiu (2004) ispituje odrednice poslovanja društava za osiguranje u Velikoj Britaniji između 1986. i 1999. Autor je koristio skup panel podataka i ispitivao je 12 varijabli na osnovu tri ključna indikatora: prinosa na ulaganje, procenat promene u fondovima akcionara i prinosa na akcionarski kapital. Rezultati istraživanja su pokazali da su performanse osiguravajućih društava pozitivno povezane sa kamatnom stopom, likvidnošću, marginom solventnosti te prinosom na kapital. Posmatrano sa druge strane, negativno su povezane sa inflacijom i reosiguranjem.

Kozak (2011) je proučavao determinante profitabilnosti društava za neživotno osiguranje u Poljskoj na uzorku od 25 društava. Došao je do zaključka da smanjenje udela osiguranja automobila u portfoliju kompanije, uz istovremeno povećanje ostalih vrsta osiguranja ima pozitivan uticaj na profitabilnost. Takođe, bruto društveni proizvod (BDP) ima pozitivne implikacije na profitabilnost.

Malik (2011) ispituje odrednice osiguranja u Pakistanu za period od 2005 do 2009. godine. Rezultati istraživanja potvrđuju da veličina kapitala i promet pozitivno utiču na performanse osiguravajućih društava, dok odnos poluge i gubitka negativno utiču na ROA.

Mehari i Aemiro (2013) su analizirali uticaj faktora specifičnih za preduzeće na indikator ROA za devet etiopskih osiguravajućih društava u periodu od 2005. do 2010. godine. Došli su do zaključka da na finansijski učinak etiopskih osiguravajućih društava značajno i pozitivno utiču veličina kompanije, materijalna imovina i leveridž, dok koeficijent gubitka ima negativan i značajan uticaj na finansijski učinak. Rezultati studije takođe pokazuju da starost društva, rast fakturisane premije i likvidnost nisu značajno povezani sa finansijskim rezultatima.

Burca i Batrinca (2014) su istraživali faktore koji utiču na finansijske performanse 21 osiguravajućeg društva koja posluju na tržištu osiguranja Rumunije tokom vremenskog intervala od 2008. do 2012. god. ROA je korišćen kao indikator finansijskog učinka. Primenom specifičnih tehnika panel podataka, autori su pokazali da su determinante finansijskog učinka na rumunskom tržištu osiguranja: finansijski leveridž, veličina društva, rast bruto fakturisane premije, rizik preuzimanja, i margina solventnosti.

Jadi (2015) analizirao je determinante finansijskog poslovanja osiguravajućih društava na osnovu njihovog rejtinga finansijske snage za 57 osiguravajućih društava u Ujedinjenom Kraljevstvu za period od 2006 do 2010. godine. Analiza je uključivala 8 varijabli specifičnih za društvo, a to su: leveridž, profitabilnost, likvidnost, veličina, reosiguranje, rast, vrsta poslovanja i organizacioni oblik. U radu su korišćene prelazne matrice rejtinga i regresioni modeli. Rad utvrđuje da su profitabilnost, likvidnost, veličina i organizacioni oblik statistički značajne determinante finansijskog učinka osiguravajućih društava u Ujedinjenom Kraljevstvu.

Pjanić i ostali (2018) analizirali su profitabilnost društava za neživotno osiguranje u Republici Srbiji za period od 2010., do 2015. godine, korišćenjem višestruke linearne regresije i nezavisnih varijabli: rast aktive, rast preduzeća, rast premije, koeficijent likvidnosti, koeficijent duga, operativni troškovi, preuzimanje osiguranja, rizik, finansijski leveridž i rast profita. Došli su do zaključka da rast premije, koeficijent duga, troškovi poslovanja i rast dobiti pozitivno i statistički značajno utiču na profitabilnost društava za neživotno osiguranje.

Dhiab (2021) ispituje faktore uticaja na profitabilnost u saudijskom sektoru osiguranja. Empirijski nalazi sugerišu da su stopa rasta premije, koeficijent nematerijalne imovine i odnos osnovnih sredstava glavni faktori koji pozitivno utiču na profitabilnost saudijskih osiguravajućih društava. Štaviše, iako su veličina preduzeća i koeficijent likvidnosti u pozitivnoj korelaciji sa profitabilnošću, njihov uticaj nije statistički značajan. Naprotiv, odnos gubitka, odnos obaveza, odnos poluge osiguranja, i u manjoj meri veličina društva negativno utiču na profitabilnost saudijskih osiguravajućih društava.

Na osnovu gornje diskusije, ovaj rad će istražiti sledeće hipoteze:

H1: Postoji pozitivna korelacija između likvidnosti i indikatora profitabilnosti odabranih osiguravajućih društava u Republici Srbiji.

H2: Postoji negativna korelacija između leveridža i indikatora profitabilnosti odabranih osiguravajućih društava u Republici Srbiji.

H3: Postoji negativna korelacija između racija troškova i indikatora profitabilnosti odabranih osiguravajućih društava u Republici Srbiji.

H4: Postoji pozitivna korelacija između stope rasta premije i indikatora profitabilnosti odabranih osiguravajućih društava u Republici Srbiji.

H5: Postoji pozitivna korelacija između stope rasta isplaćenih šteta i indikatora profitabilnosti odabranih osiguravajućih društava u Republici Srbiji.

H6: Postoji pozitivna korelacija između veličine kompanije i indikatora profitabilnosti odabranih osiguravajućih društava u Republici Srbiji.

3. Analiza odabranih indikatora sektora osiguranja u Republici Srbiji sa osvrtom na pojedine zemlje članice EU i razvijene zemlje

Makroekonomsko okruženje tokom protekle dekade bilo je nepovoljno za sektor osiguranja. Osnovna obeležja makroekonomskog okruženja ogledala su se u usporenom rastu BDP-a, obimu trgovine i investicija na globalnom nivou, izuzetno niskim pa i negativnim kamatnim stopama, nestabilnošću finansijskih tržišta i geopolitičkim rizicima. I pored svih navedenih volatilnosti svetsko tržište osiguranja je

očuvalo svoju stabilnost te pozitivne stope rasta. Izbijanjem pandemije korona virusa (COVID-19) u prvom kvartalu 2020. godine, svet je bio zahvaćen dubokom recesijom sa neizbežnim negativnim efektima i na sektor osiguranja. U uslovima pandemije sektor osiguranja se suočavao sa većim obimom odštetnih zahteva, prelivanjem negativnih ekonomskih efekata, te povećanim operativnim rizicima (Kočović i ostali, 2021). Globalno tržište osiguranja je u 2022. godini u uslovima višestrukih povećanih rizika zabeležilo realni blagi pad od oko 0,2% sa prognozom postepenog oporavka u naredne dve godine, ali ipak ispod trenda realnog rasta. Procenjen rast globalne premije neživotnih osiguranja u 2022. godini iznosio je oko 0,9%, gde je u razvijenim zemljama iznosio oko 0,6%, a u zemljama u razvoju oko 2,7%. Za razliku od premije neživotnih osiguranja, premija životnih osiguranja u 2022. godini zabeležila je realni pad za oko 1,9%, pri čemu u razvijenim zemljama pad je iznosio oko 2,8%, dok u zemljama u razvoju rast je ostvaren od oko 0,9% (Narodna banka Srbije, 2022). Grafikon u nastavku teksta ilustruje relativan trend promene ukupne premije osiguranja u Republici Srbiji za period: 2013-2022. godina.

Grafikon 1: Relativna promena ukupne premije osiguranja u Republici Srbiji za period: 2013-2022. god. (u%)

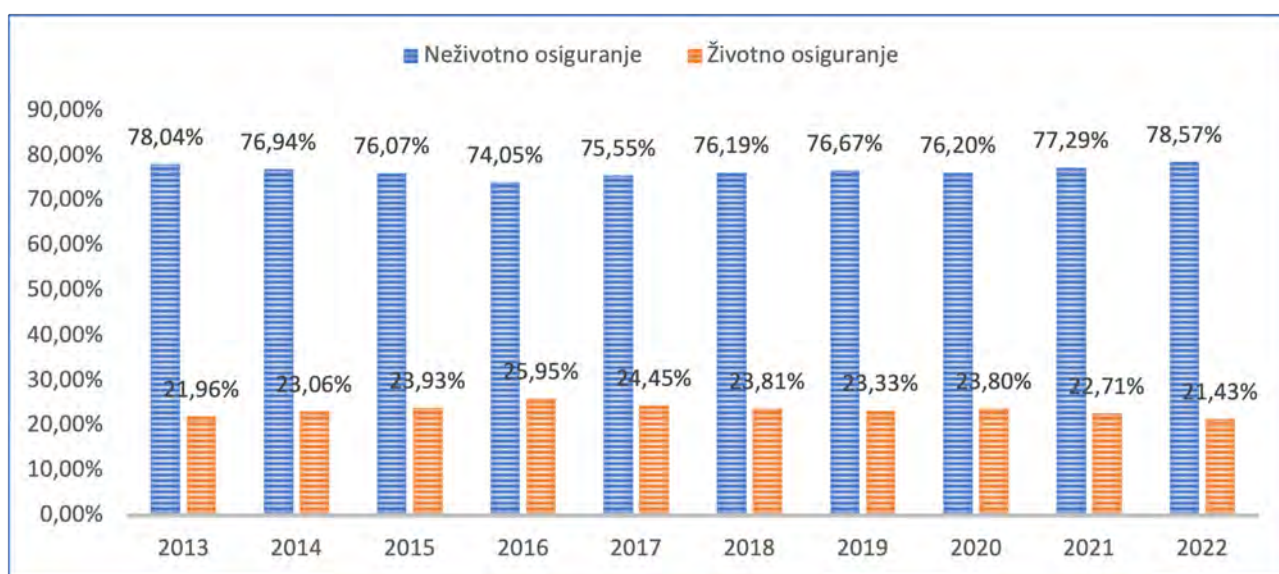


Izvor: Proračun autora na osnovu podataka Narodne banke Srbije

Iz prethodnog grafikona je uočljiv jako promenljiv i fluktuirajući obrazac kretanja ukupne premije osiguranja Republike Srbije za period: 2013-2022. godine. Blagi porast ukupne premije osiguranja je evidentan u dva perioda, i to s prelaskom sa 2015. godine sa rastom od oko 17% na rast u 2017. godini od svega 4,44%, kao i drugi period s prelaskom iz 2019. godine na 2020. godinu s blagim porastom u odnosu na prethodni period od svega 2,29%. Procenjeni globalni rast premije neživotnih osiguranja u 2017. godini iznosio je svega 3%, pri čemu u razvijenim zemljama iznosio je 2% i u zemljama u razvoju -6%. Četiri države sa najvećim učešćem u ukupnoj premiji na svetskom tržištu u 2017. godini bile su SAD, Japan, Kina i Velika Britanija, dok je Republika Srbija prema ostvarenoj premiji u 2017. godini zauzimala 82 mesto u svetu (Narodna banka Srbije, 2017). Tržišta osiguranja u uslovima pandemije su pokazala određeni stepen otpornosti, međutim procenjeni realni rast globalne premije u

razvijenim zemljama iznosio je svega 0,9% (Narodna banka Srbije, 2020). Posmatrano iz ugla prethodnih perioda najjači relativni rast ukupne premije osiguranja zabeležen je sa prelaskom iz 2013. godine 4,19% na 2015., sa oko 16,60%. Grafikon 2 prikazuje relativan trend kretanja premije neživotnog i životnog osiguranja u Republici Srbiji za period: 2013.-2022. godine.

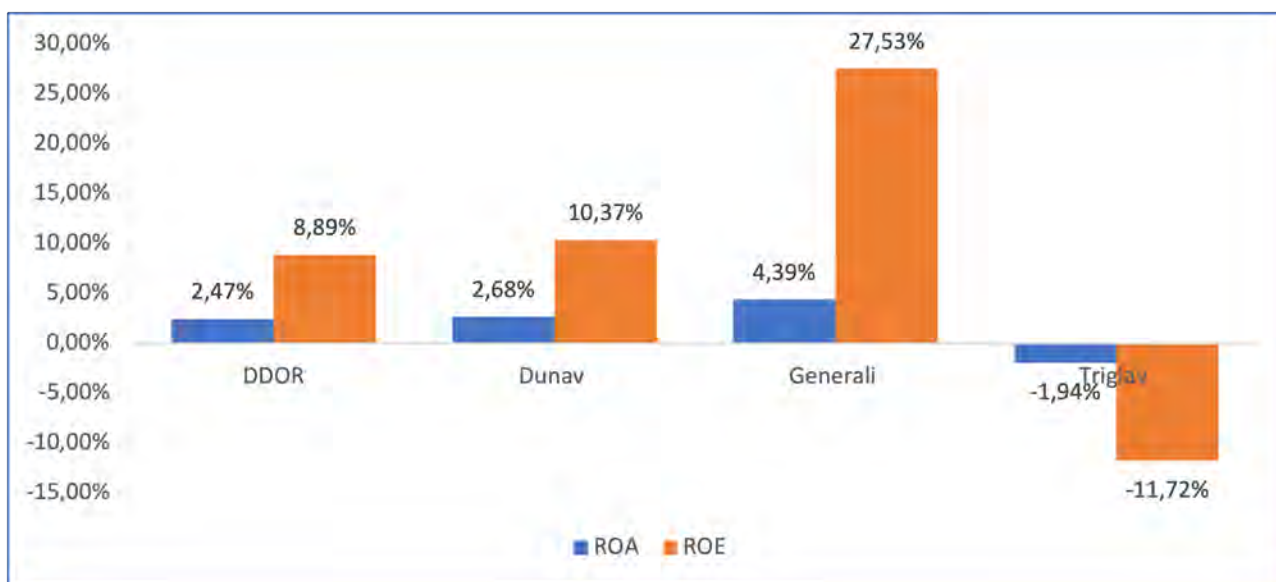
Grafikon 2: Strukturalno učešće premije neživotnog i životnog osiguranja u ukupnoj premiji osiguranja u Republici Srbiji za period: 2013 – 2022. godine (u%)



Izvor: Proračun autora na osnovu podataka Narodne banke Srbije

Iz prethodnog grafikona je evidentno značajnije učešće premije neživotnog osiguranja u odnosu na premiju životnog osiguranja. Najveće relativno učešće premije neživotnog osiguranja u ukupnoj premiji osiguranja zabeleženo je u 2022. i 2013. godini, 78,57% i 78,04% respektivno. S druge strane, najmanje relativno učešće premije neživotnog osiguranja u ukupnoj premiji osiguranja ostvareno je u 2016. godini od oko 74,05%. I prosečno učešće premije neživotnog osiguranja u ukupnoj premiji osiguranja ostvareno je u iznosu od oko 76%. Učešće premije životnog osiguranja u ukupnoj premiji osiguranja imalo je jako volatilan trend kretanja. Najmanje relativno učešće premije životnog osiguranja ostvareno je u 2022. i 2013. godini od 21,43% i 21,96% respektivno. U pogledu najveće vrednosti, premija životnog osiguranja je ostvarila svoj maksimum u 2016. godini od oko 26% u ukupnoj premiji osiguranja. Prosečno učešće premije životnog osiguranja u ukupnoj premiji osiguranja ostvarilo je vrednost od oko 23%. Najznačajniji razlozi niskog učešća premije životnog osiguranja u ukupnoj premiji osiguranja u Republici Srbiji su sledeći: niska platežna sposobnost stanovništva, nizak dohodak per capita, niska svest stanovništva o važnosti životnog osiguranja, te izraženo nepoverenje građana u dugoročne vidove štednje. Grafikon 3 ilustruje tendenciju kretanja prosečnih vrednosti indikatora profitabilnosti (ROA) i (ROE) odabranih osiguravajućih društava (DDOR, Dunav osiguranje, Generali osiguranje i Triglav osiguranje) Republike Srbije za period: 2013. -2022. godine.

Grafikon 3: Prosečne vrednosti indikatora profitabilnosti ROA i ROE odabranih osiguravajućih društava u Republici Srbiji za period: 2013. - 2022. godine (u%)



Izvor: Proračun autora na osnovu podataka Narodne banke Srbije

Profitabilnost društava za osiguranje ukazuje na vrednost kombinovanog racija u samopridržaju.* Ukoliko je vrednost ovog racija ispod 100% to ukazuje na sposobnost društava za osiguranje da iz prikupljene premije isplate štete i pokriju nastale troškove. Dok posmatrano sa druge strane, ukoliko je vrednost ovog racija iznad 100%, pretpostavlja se da društva pri određivanju visine premije uzimaju u obzir i potencijalne prihode od investiranja na finansijskom tržištu i tržištu nepokretnosti, pri čemu u tom slučaju treba imati u vidu i tržišne rizike, kao i rizike neispunjavanja obaveza druge ugovorene strane (Narodna banka Srbije, 2022). Iz prethodnog grafikona je evidentno da je osiguravajuće društvo Generali od sva četiri posmatrana osiguravajuća društva ostvarilo najveću prosečnu vrednost povrata na aktivu od oko 4,39% i povrata na prosečni kapital od oko 27,53%. Radi razumevanja ovih odnosa, a zbog nedostatka podataka za sva osiguravajuća društva možemo koristiti podatke sa bankarskog tržišta. Na tržištu banaka ukoliko je vrednost ROA veća od 2,5% to navodi na zaključak da je reč o tržištu na kome je prisutan bankarski kartel, odnosno visoko rizičnom portfoliju posmatrane banke ili događaju poput prodaje filijale. Za razliku od pokazatelja ROA, ukoliko se vrednost pokazatelja ROE kreće iznad 20-25% banka koristi ekstremno veliko zaduženje na finansijskom tržištu (Đukić, 2011). Smisao analize pomenutih indikatora profitabilnosti, kako za osiguravajuća društva, tako i za banke je da se utvrdi raspon u kretanju ovih indikatora, te da se takođe utvrdi da li banke ili osiguravajuća društva imaju zdravu ili lošu profitabilnost, a sve u kontekstu donošenja poslovnih odluka. Stepenn razvijenosti tržišta osiguranja države uslovljen je nivoom njene ekonomske razvijenosti (Kočović i ostali, 2021).

**Ovaj termin objašnjava odnos zbira merodavnih šteta i troškova sprovođenja osiguranja u samopridržaju prema merodavnoj premiji u samopridržaju.*

Osnovni pokazatelji razvijenosti tržišta osiguranja su: a) gustina osiguranja (engl. insurance density) - koji pokazuje nivo premije osiguranja po stanovniku; i b) penetracija osiguranja (engl. insurance penetration) - koji pokazuje procentualno učešće ukupne fakturisane premije osiguranja u bruto domaćem proizvodu. Tabela 1 ilustruje jedan od važnijih indikatora na tržištu osiguranja, odnosno gustinu na tržištu osiguranja, koji ima jaku analitičku snagu i dobar uvid u razvijenost tržišta osiguranja.

Tabela 1: Analiza gustine na tržištu osiguranja u zemljama u razvoju, zemljama članicama EU i razvijenim zemljama za period: 2016. – 2020. god.

Gustina na tržištu osiguranja (u evrima)						
	2016.	2017.	2018.	2019.	2020.	Prosek
Srbija	94	102	112	131	136	115
Hrvatska	278	293	324	349	349	319
Slovenija	962	1.013	1.089	1.163	1.182	1.082
Austrija	1.958	1.950	1.969	2.006	2.027	1.982
Belgija	2.284	2.269	2.371	2.462	2.348	2.347
Bugarska	143	161	190	225	225	189
Švajcarska	6.477	6.349	6.332	6.397	5.835	6.278
Kipar	901	963	1.007	1.018	1.033	984
Češka	525	535	549	583	588	556
Nemačka	2.365	2.400	2.452	2.619	2.657	2.499
Danska	5.111	5.411	5.524	5.639	5.972	5.531
Estonija	261	280	354	373	352	324
Španija	1.338	1.318	1.336	1.317	1.199	1.302
Finska	4.260	4.342	4.414	4.845	4.294	4.431
Francuska	3.299	3.108	3.225	3.331	2.937	3.180
Grčka	366	369	377	414	405	386
Mađarska	257	278	298	335	351	304
Italija	2.672	2.624	2.682	2.777	2.666	2.684

Gustina na tržištu osiguranja (u evrima)

	2016.	2017.	2018.	2019.	2020.	Prosek
Luksemburg	43.467	45.791	47.263	64.274	56.500	51.459
Letonija	199	239	267	290	289	257
Malta	1.171	1.253	1.293	1.208	1.125	1.210
Holandija	4.092	4.096	4.210	4.336	4.405	4.228
Norveška	2.646	2.656	2.807	3.012	2.978	2.820
Poljska	321	358	355	361	359	351
Portugalija	1.052	1.123	1.258	1.187	964	1.117
Rumunija	105	110	114	126	134	118
Švedska	2.789	3.013	3.210	3.355	3.714	3.216
Slovačka	962	1.013	1.089	1.163	1.182	1.082
Turska	64	72	84	105	123	90
Velika Britanija	4.038	4.504	5.182	3.902	3.709	4.267

Izvor: <http://www.insuranceeurope.eu> i Narodna banka Srbije (Prilagođeno od strane autora)

Od ukupno 30 analiziranih zemalja (zemalja u razvoju, zemalja članica EU i razvijenih zemalja) najniža prosečna vrednost gustine osiguranja je zabeležena kod Republike Turske sa oko 90 evra premije po stanovniku. Drugo mesto po najnižoj vrednosti indikatora gustine osiguranja pripada Republici Srbiji od oko 115 evra. Rumunija je zauzela treće mesto po prosečnoj vrednosti indikatora gustine osiguranja od oko 118 evra. Komparacije radi, premija po stanovniku u Republici Srbiji je u odnosu na Sloveniju oko 9 puta manja, dok je u odnosu na Luksemburg za oko 447 puta manja. Sektor osiguranja u Republici Srbiji po stepenu razvijenosti nalazi se znatno ispod proseka zemalja članica EU. Tome svedoče i indikatori o razvijenosti tržišta osiguranja.

Tabela 2 prikazuje analizu penetracije na tržištu osiguranja za ukupno 30 analiziranih zemalja (zemalja u razvoju, zemalja članica EU i razvijenih zemalja) za period od 2016. do 2020. godine.

Tabela 2: Analiza penetracije na tržištu osiguranja u zemljama u razvoju, zemljama članicama

Gustina na tržištu osiguranja (u evrima)						
	2016.	2017.	2018.	2019.	2020.	Prosek
Srbija	2,0	2,1	2,0	2,0	2,0	2,02
Hrvatska	2,50	2,50	2,60	2,60	2,90	2,62
Slovenija	4,9	4,9	4,9	5,0	5,4	5,02
Austrija	4,8	4,6	4,5	4,5	4,8	4,64
Belgija	6,0	5,8	5,9	6,0	6,0	5,94
Bugarska	2,1	2,2	2,4	2,6	2,6	2,38
Švajcarska	8,9	8,9	9,0	8,7	7,7	8,64
Kipar	4,0	4,1	4,1	4,1	4,4	4,14
Češka	3,1	3,0	2,8	2,8	2,9	2,92
Nemačka	6,2	6,1	6,1	6,3	6,6	6,26
Danska	10,3	10,6	10,6	10,5	11,2	10,64
Estonija	1,6	1,5	1,8	1,8	1,7	1,68
Španija	5,6	5,3	5,2	5,0	5,1	5,24
Finska	10,7	10,6	10,4	11,1	10,0	10,56
Francuska	9,9	9,1	9,2	9,2	8,7	9,22
Grčka	2,2	2,2	2,2	2,4	2,6	2,32
Mađarska	2,50	2,50	2,60	2,60	2,90	2,62
Italija	9,6	9,2	9,2	9,4	9,6	9,40
Luksemburg	45,7	47,6	47,4	62,1	55,2	51,60
Letonija	1,6	1,7	1,8	1,8	1,9	1,76
Malta	5,1	5,1	5,0	4,5	4,5	4,84
Holandija	9,8	9,5	9,3	9,2	9,6	9,48
Norveška	4,1	4,0	4,0	4,5	5,0	4,32
Poljska	2,9	2,9	2,7	2,6	2,6	2,74

Gustina na tržištu osiguranja (u evrima)

	2016.	2017.	2018.	2019.	2020.	Prosek
Portugalija	5,8	5,9	6,3	5,7	4,9	5,72
Rumunija	1,2	1,2	1,1	1,1	1,2	1,16
Švedska	5,9	6,3	6,9	7,2	8,1	6,88
Slovačka	4,9	4,9	4,9	5,0	5,4	5,02
Turska	0,6	0,8	1,0	1,3	1,6	1,06
Velika Britanija	10,8	12,5	14,2	10,3	9,9	11,54

Izvor: <http://www.insuranceeurope.eu> i Narodna banka Srbije (Prilagođeno od strane autora)

Razvijene tržišne ekonomije imaju preko 51% udela premije osiguranja u BDP (primer Luksemburg). Zemlje koje su takođe ostvarile visoke prosečne vrednosti udela premije u BDP-u su: Velika Britanija (11,54%), Danska (10,64%), Finska (10,56%) i Italija (9,40%). S druge strane, najniže prosečne vrednosti udela premije osiguranja u BDP – u su ostvarile sledeće ekonomije: Republika Turska (1,06%), Rumunija (1,16%), Estonija (1,68%) i Letonija (1,76%). U Republici Srbiji prosečna vrednost indikatora penetracije na tržištu osiguranja iznosila je oko 2,02% što je opet zadovoljavajuće uz postojanje potencijala za poboljšanje ove pozicije.

4. Metodologija i podaci

4.1 Model i ekonometrijska metodologija

Panel podaci se odnose na objedinjavanje opservacija o preseku domaćinstava, zemalja, preduzeća, itd., tokom nekoliko vremenskih perioda. Panel podaci se sastoje od vrednosti N broja jedinica za različite vremenske periode. Dakle, panel podaci kombinuju podatke preseka i vremenske serije. Broj jedinica je izražen kao N, dok je broj perioda izražen kao T (Baltagi, 2005).

Prednosti panel podataka su povećanje efikasnosti, kontrola individualne heterogenosti, davanje više informativnih podataka, smanjenje problema multikolinearnosti i uspostavljanje sveobuhvatnijih modela. Ograničenja panel podataka su problem kratkih vremenskih serija, problem prikupljanja podataka, i zavisnost poprečnog preseka. Panel podaci sadrže podatke o jedinicama i svaka jedinica ima individualne karakteristike. Varijable koje odražavaju karakteristike jedinica nazivaju se individualno-specifičnim efektom. Pojedinačno specifični efekat je varijabla koja se menja u jedinicama, ali je fiksirana tokom vremena. Veštine za pojedince ili menadžerske veštine za kompanije su primeri individualnih efekata. Svaki vremenski period takođe može imati specifične karakteristike. Varijabla koja odražava karakteristike vremena naziva se vremenskim efektima kao što je finansijska kriza, itd. Vremenski efekat je promenljiva koja je fiksna u jedinicama, ali se menja tokom vremena (Tatoğlu, 2018).

Panel regresiona analiza se razlikuje od poprečnog preseka ili regresije vremenske serije jer se dvostruki indeks koristi za promenljive panel podataka:

$$Y_{it} = \alpha + \beta_{1it}X1_{it} + \beta_{2it}X2_{it} + \dots + \beta_{kit}Xk_{it} + \mu_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (1)$$

gde i označava jedinice kao što su pojedinci, preduzeća, domaćinstva, zemlje (dimenzija preseka), a t - označava vreme (dimenzije vremenske serije), α - je konstantan član. β_{kit} je $K \times 1$ i X_{it} je i -to zapažanje za K eksplanatornih varijabli. μ_{it} - je termin za slučajnu grešku za koji se pretpostavlja da je identično i nezavisno distribuiran sa nultim presekom i konstantnom varijansom za sve vremenske periode i jedinice.

Model koji se koristi za merenje uticaja faktora specifičnih za preduzeća na profitabilnost odabranih osiguravajućih društava u Republici Srbiji može se predstaviti na sledeći način:

$$ROA_{it} = \alpha + \beta_1 LIQ_{it} + \beta_2 LEV_{it} + \beta_3 ER_{it} + \beta_4 GRPR_{it} + \beta_5 GRDP_{it} + \beta_6 SIZE_{it} + \mu_{it} \quad (2)$$

$$ROE_{it} = \alpha + \beta_1 LIQ_{it} + \beta_2 LEV_{it} + \beta_3 ER_{it} + \beta_4 GRPR_{it} + \beta_5 GRDP_{it} + \beta_6 SIZE_{it} + \mu_{it} \quad (3)$$

gde je:

Profitabilnost zavisna varijabla merena preko ROA i ROE indikatora.

LIQ - je odnos likvidnosti.

LEV - koeficijent poluge ili leveridž.

ER - racio troškova.

GRPR - stopa rasta premije odabranih osiguravajućih društava.

GRDP - stopa rasta isplaćenih šteta odabranih osiguravajućih društava.

SIZE - predstavlja veličinu društva.

μ_{it} - slučajna greška

Ukoliko je verovatnoća statistički značajna tj. manja od 5% treba prihvatiti postavljene hipoteze, te s druge strane ukoliko verovatnoća nije statistički značajna, odnosno veća od 5% treba odbaciti postavljene hipoteze. Test značajnosti je izveden za sve varijable korišćenjem testa pri nivou značajnosti od 95% (Chmelarova, 2007).

4.2 Podaci

Četiri predmetna osiguravajuća društva su odabrana na osnovu dominantnog tržišnog učešća u kontekstu premije osiguranja na celokupnom tržištu osiguranja u Republici Srbiji. Ovo istraživanje se fokusira na sledećim varijablama: zavisna varijabla će biti stopa povrata na aktivu odabranih osiguravajućih društava u Republici Srbiji (ROA), dok će se racio likvidnosti (LIQ), koeficijent poluge ili leveridž (LEV), racio troškova (ER), stopa rasta premije odabranih osiguravajućih društava (GRPR), stopa rasta isplaćenih šteta (GRDP) i veličina kompanije (SIZE) posmatrati kao nezavisne varijable. Istraživanje obuhvata period od 2013 do 2022. godine, što ukupno obuhvata 10 godina. Podaci su prikupljeni sa službene stranica Narodne banke Republike Srbije.

Sažetak merenja varijabli predstavljen je u tabeli 3. Diskusija o merama varijabli je sledeća:

- **Performanse:** performanse se obično mere korišćenjem računovodstvene profitabilnosti i to uglavnom prinosa na aktivu (ROA) i prinosa na kapital (ROE) (Derbali i Jamel, 2014). U ovom radu će se koristiti povrat na aktivu kao zavisna varijabla u regresionom modelu. Dakle, ROA se meri deljenjem dobiti pre oporezivanja sa ukupnom aktivom.
- **Likvidnost:** likvidnost osiguravajućih društava odražava njegovu sposobnost da izmiri kratkoročne obaveze i potraživanja uključujući operativne troškove i isplatu naknada (Mazviona i ostali, 2017). Likvidnost u ovom radu je predstavljena koeficijentom tekućeg stanja, odnosno deljenjem obrtno imovine sa kratkoročnim obavezama.
- **Koeficijent poluge ili leveridž:** leveridž je pokazatelj stepena u kome preduzeća koriste pozajmljeni novac. U ovom radu leveridž je definisan kao odnos ukupnih obaveza prema ukupnom kapitalu (Almajali i ostali, 2012).
- **Racio troškova:** u ovom radu racio troškova je definisan kao odnos između operativnih troškova i neto zarađene premije.
- **Stopa rasta premije:** perspektiva rasta osiguravajućih društava predstavlja procentualnu promenu bruto premije osiguravajućeg društva (Kripa i Ajasllari, 2016). U ovom radu stopa rasta premije se dobija kada se bruto premija tekućeg perioda podeli sa premijom iz prethodnog perioda i pomnoži sa 100.
- **Stopa rasta isplaćenih šteta:** U ovom radu stopa rasta isplaćenih šteta se dobija kada se isplaćene štete tekućeg perioda podele sa isplaćenim štetama iz prethodnog perioda i pomnože sa 100.
- **Veličina društva:** utvrđeno je da veličina osiguravajućih kompanija utiče na njihove finansijske performanse (Malik, 2011). U ovom radu veličina preduzeća je predstavljena preko logaritma ukupne imovine.

Tabela 3: Zavisne i nezavisne varijable

Skraćenica varijable	Varijabla	Metod izračunavanja
ROA	Povrat na aktivu (%)	(Dobit nakon oporezivanja/ukupna aktiva)*100
ROE	Povrat na kapital (%)	(Dobit nakon oporezivanja/kapital)*100
LIQ	Likvidnost	Tekuća aktiva/Kratkoročne obaveze
LEV	Koeficijent poluge ili leveridž	Ukupne obaveze/Ukupni kapital
ER	Racio troškova	(Operativni rashodi/Neto zarađena premija)*100

Skraćenica varijable	Varijabla	Metod izračunavanja
GRPR	Stopa rasta premije	Procentualna promena bruto premije tekućeg u odnosu na prethodni period
GRDP	Stopa rasta isplaćenih šteta	Procentualna promena isplaćenih šteta tekućeg u odnosu na prethodni period
SIZE	Veličina kompanije	Logaritam ukupne aktive

Izvor: Proračun autora

5. Empirijski nalazi

5.1 Deskriptivna statistika

Tabela u nastavku predstavlja indikatore deskriptivne statistike varijabli korišćenih u ovom radu. Ukupan broj opservacija iznosi 40 što predstavlja relativno reprezentativan uzorak, kako sa stajališta dostupnih podataka na tržištu osiguranja u Republici Srbiji, tako i u kontekstu vremenskog okvira. Može se primetiti da se ROA za odabrana osiguravajuća društva u Republici Srbiji (DDOR, Dunav osiguranje, Generali osiguranje i Triglav osiguranje) kreće od minimalnih minus 18,0% do maksimalnih 6,0% sa prosekom od 1,90%. Najveću srednju vrednost su ostvarile varijable ratio troškova od 60,98% i stopa rasta isplaćenih šteta od 11,58% respektivno. U kontekstu kretanja prve mere rizika, odnosno standardne devijacije najjaču kolebljivost su zabeležile sledeće varijable: stopa rasta isplaćenih šteta 16,67% i stopa rasta premije od oko 8,17%. Najveće relativno povećanje isplaćenih šteta u 2022. godini u odnosu na 2013. godinu su imala sledeća osiguravajuća društva: Generali osiguranje od oko 213,68% i Triglav osiguranje od oko 166,62% (Narodna banka Srbije, 2022). Prosečni rast premije iznosi oko 6,46%, što svakako ukazuje na perspektivu ove industrijske grane posebno u segmentu životnih osiguranja. Ratio likvidnosti je u proseku skoro 1.

Tabela 4: Deskriptivna statistika između zavisne i nezavisnih varijabli u modelu odabranih osiguravajućih društava Republike Srbije za period: 2013 – 2022.

	Srednja vrednost	Varijansa	Std. Devijacija	Min	Max	Mera asimetrije	Spljoštenost	Broj opservacija
ROA	1,900	22,25	4,717	-18,00	6,00	-3,03	10,01	40
LIQ	0,989	0,058	0,241	0,37	1,42	-0,451	0,132	40
LEV	1,459	0,075	0,274	0,92	1,98	-0,131	-0,597	40

	Srednja vrednost	Varijansa	Std. Devijacija	Min	Max	Mera asimetrije	Spljoštenost	Broj observacija
ER	60,985	24,232	4,923	52,9	73,3	0,250	-0,155	40
GRPR	6,456	66,817	8,174	-16,73	25,52	-0,464	2,069	40
GRDP	11,577	277,82	16,668	-15,34	66,60	1,07	2,04	40
SIZE	7,32	0,183	0,427	6,11	7,87	-0,756	0,309	40

Izvor: Kalkulacija autora na osnovu podataka Narodne banke Srbije

5.2 Korelaciona analiza

Pallant (2010) navodi da je korelacija vrlo važna u prikazivanju pravca i jačine neprekidne povezanosti među posmatranim varijablama. Prema Cohen-u (1988) ukoliko se koeficijent korelacije kreće od 0,10 do 0,29 onda je reč o maloj korelaciji. Takođe, ukoliko se koeficijent korelacije kreće od 0,30 do 0,49 onda je prisutna srednja korelacija. I ukoliko koeficijent korelacije poprima vrednosti od 0,50 do 1,0 onda je evidentno da je korelacija velika. Prema Asteriou i Hall (2007) korelacije manje od 0,9 ne izazivaju ozbiljan problem multikolinearnosti u regresionoj analizi. Hair i ostali (2010) sugerišu da matrica korelacije ne bi trebalo da prelazi 0,70 da bi se garantovalo da problem multikolinearnosti nije prisutan.

Tabela 5: Korelaciona analiza (Pearson koeficijent korelacije) između zavisne varijable i nezavisnih varijabli odabranih osiguravajućih društava Republike Srbije za period: 2013. – 2022. god.

		ROA	LIQ	LEV	ER	GRPR	GRDP	SIZE
ROA	Pearson Correlation	1,000	0,554	-0,489	-0,107	0,168	-0,120	0,570
	Sig. (2-tailed)	-	0,000	0,001	0,510	0,301	0,460	0,000
	N	40	40	40	40	40	40	40
LIQ	Pearson Correlation	0,554	1,000	-0,659	0,385	-0,066	0,052	0,439
	Sig. (2-tailed)	0,000	-	0,000	0,014	0,686	0,748	0,005
	N	40	40	40	40	40	40	40
LEV	Pearson Correlation	-0,489	-0,659	1,000	-0,371	-0,061	0,018	-0,224
	Sig. (2-tailed)	0,001	0,000	-	0,019	0,709	0,912	0,165
	N	40	40	40	40	40	40	40

		ROA	LIQ	LEV	ER	GRPR	GRDP	SIZE
ER	Pearson Correlation	-0,107	0,385	-0,371	1,000	-0,039	0,280	0,292
	Sig. (2-tailed)	0,510	0,014	0,019	-	0,810	0,080	0,067
	N	40	40	40	40	40	40	40
GRPR	Pearson Correlation	0,168	-0,066	-0,061	-0,039	1,000	0,421	-0,086
	Sig. (2-tailed)	0,301	0,686	0,709	0,810	-	0,007	0,598
	N	40	40	40	40	40	40	40
GRDP	Pearson Correlation	-0,120	0,052	0,018	0,280	0,421	1,000	-0,133
	Sig. (2-tailed)	0,460	0,748	0,912	0,080	0,007	-	0,415
	N	40	40	40	40	40	40	40
SIZE	Pearson Correlation	0,570	0,439	-0,224	0,292	-0,086	-0,133	1,000
	Sig. (2-tailed)	0,000	0,005	0,165	0,067	0,598	0,415	-
	N	40	40	40	40	40	40	40

Izvor: Kalkulacija autora na osnovu podataka Narodne banke Srbije

Iz prethodne tabele je evidentno da su najjaču pozitivnu korelaciju sa zavisnom promenljivom, odnosno povratom na aktivu (ROA) ostvarile sledeće nezavisne varijable: veličina osiguravajućih društava (0,570) i likvidnost osiguravajućih društava pri signifikantnošću ($p < 0,05$). Prema Subrahmanyam i Titman (2001) likvidnost poboljšava finansijske performanse poslovanja preduzeća. Osiguravajuća društva sa likvidnijom imovinom imaju manju verovatnoću da propadnu jer mogu zaraditi novac u vremenima kada je potreban i na taj način nadmašiti one institucije sa manje likvidnom imovinom. Browne i ostali., (2001) su pronašli dokaze koji podržavaju tezu da su performanse u pozitivnoj korelaciji sa procentom likvidnih sredstava u strukturi imovine osiguravajućih društava. Liargovas i Skandalis (2008) su došli do zaključka da veća likvidnost omogućava preduzeću da se nosi sa nepredvidivim situacijama i ispunjava svoje obaveze tokom perioda niskog profita. Posmatrano sa druge strane, najznačajnija negativna korelacija je zabeležena između leveridža i povrata na aktivu (-0,489) pri signifikantnosti manjoj od 5%.

Tabela 6: Sumarna korelaciona statistika između zavisne i nezavisnih varijabli odabranih osiguravajućih društava u Republici Srbiji za period: 2013.-2022. god.

Zavisne varijable	R	R ²	Prilagođen R ²	Standardna greška procene	Durbin – Watson statistika
ROA	0,836	0,700	0,646	2,81339	2,497
ROE	0,747	0,559	0,479	17,1470	2,997

Izvor: Kalkulacija autora na osnovu podataka Narodne banke Srbije

Iz prethodne tabele je evidentno da prilagođeni koeficijent determinacije iznosi 64,60% što znači da nezavisne promenljive vrše predikciju na prvu zavisnu promenljivu, odnosno ROA u datom iznosu, dok na drugu promenljivu odnosno ROE vrše predikciju sa oko 47,90%. Dobijene vrednosti u pogledu Durbin-Watson statistike su neznatno različite. I jedna i druga zavisna varijabla su imale vrednosti veće od 2, a manje od 3 što navodi na zaključak da je reč o pozitivnoj serijskoj korelaciji.

5.3 Rezultati procene

Panel regresioni metodi (metod najmanjih kvadrata, metod potpuno modifikovanih najmanjih kvadrata i robusni metod najmanjih kvadrata) su odabrani zato što sa jedne strane imaju jako dobru predikcionu snagu i diskriminaciju nezavisnih varijabli na zavisne promenljive, te sa druge strane smanjuju stepen multikolinearnosti. Rezultati analize pokazuju da vrednost prilagođenog koeficijenta determinacije kod metode najmanjih kvadrata iznosi oko 64,63% čime se objašnjava uticaj odabranih nezavisnih varijabli na zavisnu promenljivu u modelu. Za razliku od metode najmanjih kvadrata, prilagođeni koeficijent determinacije kod metoda modifikovanih najmanjih kvadrata dostigao je vrednost od oko 64,21% što je skoro na istom nivou kao i kod metode najmanjih kvadrata. S druge strane, najmanja vrednost koeficijenta determinacije zabeležena je kod robusnog metoda najmanjih kvadrata od svega 17,09% čime se objašnjava uticaj nezavisnih varijabli na zavisnu promenljivu u modelu. Takođe, i vrednost F – statistike kod metode najmanjih kvadrata je visoka (12,877), kao i verovatnoća je jednaka nuli što ukazuje na to da je model jako značajan.

Tabela 7: Koeficijenti nezavisnih varijabli pod višestrukom regresijom najmanjih kvadrata, metodom potpuno modifikovanih najmanjih kvadrata i robusnim metodom najmanjih kvadrata za period: 2013. – 2022. god.

Regresioni model	Metod najmanjih kvadrata			Metod potpuno modifikovanih najmanjih kvadrata			Robusni metod najmanjih kvadrata		
Zavisna varijabla - ROA									
Nezavisne varijable	Koef.	Std. Greška	Verovatnoća	Koef.	Std. Greška	Verovatnoća	Koef.	Std. Greška	Verovatnoća
C	8,861	2,199	0,0003	8,061	1,895	0,0002	1,835	1,359	0,176
LIQ	0,049	0,033	0,1420	0,048	0,028	0,0988	0,011	0,020	0,577
LEV	-0,059	0,027	0,0390	-0,061	0,024	0,0157	-0,018	0,017	0,274
ER	-1.29E-05	3.09E-06	0,0002	-1.18E-05	2.66E-06	0,0001	-2.69E-06	1.91E-06	0,0002
GRPR	0,001	0,0006	0,0962	0,0013	0,00056	0,0196	-0,0002	0,0003	0,459

Regresioni model	Metod najmanjih kvadrata			Metod potpuno modifikovanih najmanjih kvadrata			Robusni metod najmanjih kvadrata		
Zavisna varijabla - ROA									
Nezavisne varijable	Koef.	Std. Greška	Verovatnoća	Koef.	Std. Greška	Verovatnoća	Koef.	Std. Greška	Verovatnoća
GRDP	8.19E-06	0,0003	0,9809	-7.37E-05	0,0002	0,8040	0,0003	0,0002	0,139
SIZE	0,059	0,0126	0,000	0,0605	0,0109	0,0000	0,0186	0,0078	0,0172
Koeficijent determinacije	0,7007			0,6986			0,1709		
Pseudo koeficijent determinacije	-			-					
Prilagođeni koeficijent determinacije	0,6463			0,6421			0,0202		
F-Statistika	12,877			-			-		
Verovatnoća (F-statistika)	0,0000			-			-		
Verovatnoća (Rn-statistika)	-			-			-		
Prob (Quasi -LR statistika)	-			-			-		

Izvor: Proračun autora

Testiranjem prve istraživačke hipoteze da likvidnost ima pozitivan uticaj na prvu zavisnu promenljivu tj. povrat na aktivu - ROA, rezultati istraživanja upućuju na zaključak da kod sva tri metoda imamo pozitivnu vrednost koeficijenta, ali sa verovatnoćom većom od 5%. S tim u vezi, odbacujemo prvu istraživačku hipotezu da likvidnost ima pozitivan uticaj na prvu zavisnu varijablu odnosno na ROA.

Kod sva tri posmatrana modela je zabeležena negativna korelacija između leveridža i povrata na aktivu posmatranih osiguravajućih društava. Međutim, najveći negativni uticaj je zabeležen kod metode potpuno modifikovanih najmanjih kvadrata sa značajnošću manjom od 5% (0,0157), kao i kod metoda najmanjih kvadrata sa značajnošću takođe manjom od 5% (0,0390). Dakle, kod metode potpuno modifikovanih najmanjih kvadrata ovo praktično znači da ako se zaduženost poveća za oko 1% povrat na aktivu će se smanjiti za oko 0.061 jedinicu pod pretpostavkom da ostale varijable ostanu nepromenjene. Osiguravajuće kompanije veliku pažnju trebaju posvetiti leveridžu jer kompanije koje imaju višestruku polugu mogu biti u opasnosti od bankrota ako nisu u stanju da izmire svoj dug, isto tako možda neće moći da pronađu nove zajmodavce u budućnosti. S druge strane, zaduživanje može povećati prinos akcionara na njihova ulaganja, te dobro iskoristiti poreske pogodnosti povezane sa zaduživanjem (Kaguri, 2013).

Takođe, osiguravajuća društva sa visokom stopom zaduženosti su prinuđena da ograniče svoju profitabilnost. Dakle, dolazimo do zaključka da odbacujemo drugu istraživačku hipotezu da između leveridža i indikatora profitabilnosti odabranih osiguravajućih društava postoji negativna korelacija.

Između racija troškova i prvog indikatora profitabilnosti tj. ROA je prisutna negativna korelacija kod sve tri metode sa verovatnoćom manjom od 5%. S tim u vezi, možemo doći do zaključka da prihvatamo treću istraživačku hipotezu da između racija troškova i indikatora ROA odabranih osiguravajućih društava postoji negativna kauzalnost.

Testiranjem četvrte istraživačke hipoteze da stopa rasta premije ima pozitivan uticaj na profitabilnost, dolazimo do zaključka da kod prve dve metode (metod najmanjih kvadrata i metod potpuno modifikovanih najmanjih kvadrata) imamo pozitivnu korelaciju, ali sa različitim verovatnoćama. Dakle, samo kod metode potpuno modifikovanih najmanjih kvadrata imamo verovatnoću manju od 5%. Na osnovu vrednosti verovatnoća kod sve tri metode dolazimo do zaključka da odbacujemo četvrtu istraživačku hipotezu da stopa rasta premije ima pozitivan uticaj na indikator ROA.

Ispitivanjem pete istraživačke hipoteze da stopa rasta isplaćenih šteta ima pozitivan uticaj na indikator profitabilnosti (ROA) dolazi se do zaključka da kod metode najmanjih kvadrata i robusnog metoda najmanjih kvadrata postoji pozitivna korelacija sa verovatnoćom većom od 5%. Kod metode potpuno modifikovanih najmanjih kvadrata postoji negativna korelacija između stope rasta isplaćenih šteta i ROA sa verovatnoćom većom od 5%. Dakle, dolazimo do zaključka za odbacivanje pete istraživačke hipoteze da između stope rasta isplaćenih šteta i ROA postoji pozitivna korelacija.

Takođe, pozitivna korelacija je ostvarena i između veličine odabranih osiguravajućih društava u Srbiji i povrata na aktivu kod sva tri panel regresiona modela sa blagom prednošću kod metoda najmanjih kvadrata sa vrednošću koeficijenta od 0.06 i značajnošću od 0.000 što se smatra jakom signifikantnošću. Ovim se potvrđuje šesta istraživačka hipoteza da veličina društava ima pozitivan uticaj na prvu zavisnu promenljivu odnosno na ROA. Pozitivan odnos između veličine kompanija i indikatora ROA znači da se veličina koristi da bi se obuhvatila činjenica da veća osiguravajuća društva bolje koriste ekonomiju obima u transakcijama i uživaju veći nivo profita. Slični zaključci su dobijeni i prema rezultatima studije Sambasivama i Ayele (2013). Studija takođe preporučuje visoko razmatranje povećanja imovine društava, iz razloga što je veličina društava važan faktor jer utiče na konkurentsku moć. Mala preduzeća imaju manje moći od velikih i teže se mogu takmičiti sa velikim preduzećima posebno na visoko konkurentnim tržištima. Takođe, jako je bitno da osiguravači treba da procene mogućnosti spajanja i akvizicija da bi postale veće.

Tabela 8 ilustruje uticaj nezavisnih varijabli na zavisnu promenljivu (ROE) putem metoda najmanjih kvadrata, metoda potpuno modifikovanih najmanjih kvadrata i robusnog metoda najmanjih kvadrata za period: 2013-2022. god.

Dobijeni rezultati analize (tabela 8) pokazuju da vrednost prilagođenog koeficijenta determinacije kod metode najmanjih kvadrata iznosi oko 47,90% čime se objašnjava predikcija odabranih nezavisnih varijabli na zavisnu u modelu tj. povrat na kapital (ROE). Za razliku od metode najmanjih kvadrata, prilagođeni koeficijent determinacije kod metoda modifikovanih najmanjih kvadrata dostigao je vrednost od oko 47,40% što je skoro na istom nivou kao i kod metode najmanjih kvadrata. S druge strane, najmanja vrednost koeficijenta determinacije zabeležena je kod robusnog metoda najmanjih kvadrata od svega 17,70 % čime se objašnjava uticaj nezavisnih varijabli na zavisnu promenljivu u modelu. Takođe, i vrednost F – statistike kod metode najmanjih kvadrata iznosi 6,984 kao i verovatnoća je jednaka nuli, što ukazuje na to da je model jako značajan.

Tabela 8: Koeficijenti nezavisnih varijabli pod višestrukom regresijom najmanjih kvadrata, metodom potpuno modificovanih najmanjih kvadrata i robusnim metodom najmanjih kvadrata za period: 2013 – 2022.

Regresioni model	Metod najmanjih kvadrata			Metod potpuno modificovanih najmanjih kvadrata			Robusni metod najmanjih kvadrata		
Zavisna varijabla - ROA									
Nezavisne varijable	Koef.	Std. Greška	Verovatnoća	Koef.	Std. Greška	Verovatnoća	Koef.	Std. Greška	Verovatnoća
C	44,434	13,410	0,002	38,799	7,856	0,000	7,775	5,126	0,129
LIQ	0,115	0,201	0,569	0,094	0,119	0,433	0,243	0,077	0,002
LEV	-0,220	0,168	0,199	-0,209	0,099	0,043	0,004	0,064	0,952
ER	-6,53E-05	1,88E-05	0,001	-5,73E-05	1,10E-05	0,000	-1,18E-05	7,20E-06	0,001
GRPR	0,004	0,004	0,323	0,005	0,002	0,030	-0,001	0,001	0,856
GRDP	0,001	0,002	0,653	0,001	0,001	0,821	0,001	0,001	0,348
SIZE	0,345	0,077	0,000	0,340	0,045	0,000	0,072	0,029	0,014
Koeficijent determinacije	0,559			0,557			0,304		
Pseudo koeficijent determinacije	-			-			-		
Prilagođeni koeficijent determinacije	0,479			0,474			0,177		
F-Statistika	6,984			-			-		
Verovatnoća (F-statistika)	0,000			-			-		
Verovatnoća (Rn-statistika)	-			-			-		
Prob (Quasi -LR statistika)	-			-			-		

Izvor: Proračun autora

Dobijeni rezultati predikcije nezavisnih varijabli na zavisnu promenljivu tj. povrat na kapital su skoro identični sa rezultatima uticaja nezavisnih varijabli na prvu zavisnu promenljivu, odnosno povrat na aktivu, sa razlikom da je kod robusne metode najmanjih kvadrata uticaj likvidnosti pozitivan i sa značajnošću manjom od 5%, što implicira na sveukupni zaključak da se odbacuje prva istraživačka hipoteza da likvidnost pozitivno utiče na drugu zavisnu varijablu odnosno ROE. Što se tiče nezavisne varijable leveridža imamo kod metode potpuno modifikovanih najmanjih kvadrata negativnu korelaciju sa zavisnom varijablom ROE i verovatnoću od 0,04. Kod metode najmanjih kvadrata imamo takođe negativnu korelaciju, ali značajnost veću od 5%. I kod robusnog metoda najmanjih kvadrata imamo pozitivnu korelaciju leveridža sa zavisnom promenljivom ROE i značajnost znatno veću od 5%. Na osnovu datih rezultata možemo odbaciti drugu istraživačku hipotezu da je leveridž u negativnoj korelaciji sa indikatorom ROE. Kod sve tri metode (metod najmanjih kvadrata, metod potpuno modifikovanih najmanjih kvadrata i robusni metod najmanjih kvadrata) imamo negativnu korelaciju između racija troškova i druge zavisne promenljive ROE, ali sa različitom značajnošću. Kod sve tri metode (metoda najmanjih kvadrata, metoda potpuno modifikovanih najmanjih kvadrata i robusni metod najmanjih kvadrata) imamo verovatnoću manju od 5% između racija troškova i indikatora ROE. S tim u vezi, možemo doći do zaključka da prihvatamo treću istraživačku hipotezu da je racio troškova u negativnoj korelaciji sa drugom zavisnom promenljivom tj. ROE. Testiranjem četvrte istraživačke hipoteze da stopa rasta premije ima pozitivan uticaj na profitabilnost, dolazimo do zaključka da kod sve tri metode imamo pozitivnu korelaciju, ali sa različitim verovatnoćama. Dakle, samo kod metode potpuno modifikovanih najmanjih kvadrata imamo verovatnoću manju od 5% što implicira na zaključak da odbacujemo četvrtu istraživačku hipotezu da stopa rasta premije ima pozitivan uticaj na indikator ROE. U kontekstu testiranja pete istraživačke hipoteze da stopa rasta isplaćenih šteta ima pozitivni uticaj na drugu zavisnu promenljivu, tj. ROE, dolazi se do zaključka da kod sva tri metoda imamo pozitivnu korelaciju, ali sa verovatnoćom većom od 5%. Dakle, dati rezultati upućuju na zaključak da se ne prihvata peta istraživačka hipoteza da stopa rasta isplaćenih šteta ima pozitivnu korelaciju sa drugom zavisnom promenljivom ROE. I testiranjem poslednje istraživačke hipoteze da veličina društva ima pozitivnu korelaciju na drugu zavisnu promenljivu odnosno ROE, može se doći do zaključka da je kod sva tri metoda prisutna pozitivna korelacija i verovatnoća manja od 5%. S tim u vezi, dolazimo do novog zaključka da se prihvata šesta istraživačka hipoteza da veličina društva ima pozitivan uticaj na ROE odabranih osiguravajućih društava u Republici Srbiji.

Tabela 9: Rezime rezultata istraživanja

Hipoteze	Očekivana korelacija	Empirijski rezultat
H1: Postoji pozitivna korelacija između likvidnosti i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	+	Prva istraživačka hipoteza je odbačena
H2: Postoji negativna korelacija između leveridža i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	-	Druga istraživačka hipoteza je odbačena

Hipoteze	Očekivana korelacija	Empirijski rezultat
H3: Postoji negativna korelacija između racija troškova i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	-	Treća istraživačka hipoteza je u potpunosti prihvaćena
H4: Postoji pozitivna korelacija između stope rasta premije i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	+	Četvrta istraživačka hipoteza je odbačena
H5: Postoji pozitivna korelacija između stope rasta isplaćenih šteta i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	+	Peta istraživačka hipoteza je odbačena
H6: Postoji pozitivna korelacija između veličine kompanije i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	+	Šesta istraživačka hipoteza je u potpunosti prihvaćena
H5: Postoji pozitivna korelacija između stope rasta isplaćenih šteta i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	+	Peta istraživačka hipoteza je odbačena
H6: Postoji pozitivna korelacija između veličine kompanije i indikatora profitabilnosti odabranih osiguravajućih kompanija u Republici Srbiji.	+	Šesta istraživačka hipoteza je u potpunosti prihvaćena

Izvor: Proračun autora

Zaključna razmatranja

Tržište osiguranja na globalnom planu razvija se dinamično i prostorno i vremenski neujednačeno, pod uticajem velikog broja faktora. Osiguranje je već godinama efikasan način zaštite od rizika. Osiguravači moraju da obezbede određeni nivo profitabilnosti da bi nastavili sa svojim aktivnostima i ispunili svoje obaveze. Iz tog razloga je važno proučiti faktore koji utiču na profitabilnost osiguravajućih društava. Cilj ovog rada je bio da se empirijski ispituju specifični faktori koji utiču na profitabilnost odabranih osiguravajućih društava u Republici Srbiji mereno preko indikatora ROA i ROE. Panel analiza je zasnovana na skupu podataka za četiri vodeća osiguravajuća društva u Republici Srbiji u periodu od 2013. do 2022. godine, a na osnovu godišnjih izveštaja posmatranih osiguravajućih društava.

Faktori koji su identifikovani da imaju značajnog uticaja na indikatore profitabilnosti odabranih osiguravajućih društava su veličina društva i racio troškova. Koeficijenti dobijeni u ovom radu putem panel regresionih modela pokazuju da likvidnost nema potpuno statistički značajnu predikciju na drugi indikator profitabilnosti ROE, čime se odbacuje prva istraživačka hipoteza.

Testiranjem druge istraživačke hipoteze rezultati analize su pokazali da je kod sva tri posmatrana metoda zabeležena negativna korelacija između leveridža i povrata na aktivu posmatranih osiguravajućih društava, ali sa različitom značajnošću. Značajnost manja od 5% zabeležena je kod metode potpuno modifikovanih najmanjih kvadrata, kao i kod metoda najmanjih kvadrata. Uticaj leveridža na drugu zavisnu varijablu, odnosno ROE kod metode najmanjih kvadrata i metode potpuno modifikovanih najmanjih kvadrata ima negativnu korelaciju, dok kod robusnog metoda najmanjih kvadrata je zabeležena pozitivna korelacija. Sveobuhvatno posmatrano u kontekstu kretanja vrednosti verovatnoće, dolazi se do zaključka da se druga istraživačka hipoteza odbacuje.

Rezultati predstavljenih modela pokazuju da između racija troškova i zavisnih varijabli u modelu (ROA i ROE) je zabeležena negativna korelacija, sa zadovoljavajućom značajnosti u kontekstu verovatnoće. Na osnovu dobijenih rezultata došli smo do zaključka da racio troškova negativno utiče na indikatore profitabilnosti, te se treća istraživačka hipoteza u potpunosti prihvata.

Rezultati testiranja četvrte istraživačke hipoteze su pokazali da stopa rasta premije ima pozitivan uticaj na profitabilnost kod metode najmanjih kvadrata i metode potpuno modifikovanih najmanjih kvadrata, ali sa različitim verovatnoćama. Dakle, samo kod metode potpuno modifikovanih najmanjih kvadrata imamo verovatnoću manju od 5% što upućuje na zaključak za odbacivanjem četvrte istraživačke hipoteze. Testiranjem pete istraživačke hipoteze rezultati analize su pokazali da je kod posmatranih metoda zabeležena i pozitivna i negativna vrednost koeficijenata između stope rasta isplaćenih šteta i indikatora profitabilnosti sa značajnošću iznad 5%, što implicira na zaključak za odbacivanjem pete istraživačke hipoteze.

Rezultati predstavljenih modela pokazuju da između veličine društva i zavisnih varijabli u modelu (ROA i ROE) je zabeležena pozitivna korelacija, sa vrednostima verovatnoće ispod 5%, što navodi na zaključak da veličina društva ima pozitivan signifikantan uticaj na performanse profitabilnosti čime se i potpuno prihvata šesta istraživačka hipoteza.

Bez obzira na to da rezultati datih modela (osim modela potpuno modifikovanih najmanjih kvadrata) ne pokazuju da je rast premije osiguranja važan faktor profitabilnosti, te imajući u vidu da je tržište životnih osiguranja u Srbiji još uvek nerazvijeno, u budućnosti posebnu pažnju treba posvetiti potencijalu rasta ovog tržišta u skladu sa savremenim tržišnim uslovima koje obeležavaju brojne demografske, političke, društvene i ekonomske promene. Osiguravajuća društva u Srbiji treba da više obrate pažnju na dobijene signifikantne faktore s obzirom na njihovu važnu ulogu u pogledu predikcije i uticaja na njihov finansijski učinak i uspeh.

Ograničenje ovog istraživanja koje se odnosi na analizu uticaja nezavisnih varijabli na indikatore profitabilnosti odabranih osiguravajućih društava Republike Srbije se ogleda u netransparentnosti podataka u kontekstu proizvoda životnog osiguranja, zbog čega nismo bili u mogućnosti da analiziramo profitabilnost individualnih proizvoda životnih osiguranja. Takođe, i širi izbor varijabli, te povećanje uzorka osiguravajućih društava iz zemalja Zapadnog Balkana može biti ograničenje, kao i preporuka za dalja istraživanja.

Reference

1. Adams, M., Buckle, M. (2003). The determinants of corporate financial performance in the Bermuda insurance market. *Applied Financial Economics*, Vol. 13(2), pp. 133-143.
2. Almajali, A. Y., Alamro, S. A., Al-Soub, Y. Z. (2012). Factors affecting the financial performance of Jordanian insurance companies listed at Amman Stock Exchange. *Journal of Management research*, Vol. 4(2), pp. 266-289.
3. Asteriou, D., Hall, S. G. (2007). *Applied Econometrics: a modern approach*, revised edition. Hampshire: Palgrave Macmillan.
4. Baltagi, B.H. (2005). *Econometric Analysis of Panel Data*, Third edition. John Wiley & Sons, Ltd.
5. Browne, R., Janney, J., Paul, K., Muralidhar, K., Ruff, B. (2001). An Empirical Investigation of the Stakeholder Theory Perspective, *Journal of Business Ethics*, Vol. 32 (2), pp. 143-156.
6. Burca, A.M., Batrinca, G. (2014). "The determinants of financial performance in the Romanian insurance market" *International Journal of Academic Research in Accounting, Finance and Management Sciences*, Vol. 4(1), pp. 299-308.
7. Cohen, J.W. (1988). *Statistical power analysis for the behavioral sciences* (2nd edn). Hillsdale, NJ: Lawrence Erlbaum.
8. Chmelarova, V. (2007). The Hausman test and some alternatives, with heteroskedastic data. M.S. Louisiana State University, USA.
9. Cummins, J. D., Nini, G. P. (2002). Optimal capital utilization by financial firms: Evidence from the property-liability insurance industry. *Journal of Financial Services Research*, Vol. 21, pp. 15-53.
10. Derbali, A., Jamel, L. (2014). Determinants of performance of Tunisia insurance companies: Case of life insurance. *International Journal of Innovation and Applied Studies*, Vol. 6(1), pp. 90-96.
11. Dhiab, L.B. (2021). Determinants of Insurance Firms' Profitability: An Empirical Study of Saudi Insurance Market, *Journal of Asian Finance, Economics and Business*. Vol 8 No 6 (2021) pp. 235-243.
12. Đukić, Đ. (2011). *Upravljanje rizicima i kapitalom u bankama*. Centar za izdavačku delatnost Ekonomskog fakulteta u Beogradu: Beograd.
13. Hair Jr. J. F., Black, J. W., Babin, B. J., Anderson, E. R. (2010). *Multivariate Data Analysis* (Seventh). Edinburgh: Pearson Education Limited.
14. Jadi, D. M. (2015). An empirical analysis of determinants of financial performance of insurance companies in the United Kingdom. Ph.D. thesis, University of Bradford.
15. Kaguri, A. W. (2013). Relationship between firm characteristics and financial performance of life insurance companies in Kenya. Unpublished M. Sc. Thesis, University of Nairobi, Kenya.
16. Kaya, Ö. E., Kaya, B. (2015). Türkiye'de Hayat Sigortası Şirketlerinin Finansal Performansını Belirleyen Firmaya Özgü Faktörler: Panel Veri Analizi. *Finansal Araştırmalar ve Çalışmalar Dergisi*, 7(12):93.
17. Kočović, J., Antić-Rakonjac, T., Koprivica, M., Šulejić, P. (2021). Osiguranje u teoriji i praksi. Univerzitet u Beogradu - Ekonomski fakultet. Centar za izdavačku delatnost. Beograd.
18. Kozak, S. (2011). Determinants of profitability of non-life insurance companies in Poland during integration with the European financial system. *Electronic Journal of Polish Agricultural Universities*, 14(1), pp. 1-9.
19. Kripa, D., Ajasllari, D. (2016). Factors affecting the profitability of Insurance Companies in Albania. *European Journal of Multidisciplinary Studies*, Vol. 1(1), pp. 352-360.
20. Liargovas, P., Skandalis, K. (2008). Factor affecting firms financial performance, The Case of Greece, University of Peloponnese.

21. Malik, H. (2011). Determinants of insurance companies' profitability: An analysis of insurance sector of Pakistan. *Academic Research International*, Vol. 1(3), p. 315.
22. Malik, H. (2011). Determinants of insurance companies profitability: An analysis of insurance sector of Pakistan. *Academic Research International*, Vol. 1(3), pp.315-321.
23. Mazviona, B. W., Dube, M., Sakahuhwa, T. (2017). An Analysis of Factors Affecting the Performance of Insurance Companies in Zimbabwe. *Journal of Finance and Investment Analysis*. Vol. 6(1), pp.11-30.
24. Mehari, D., Aemiro, T. (2013). "Firm specific factors that determine insurance companies' performance in Ethiopia". *European Scientific Journal*, Vol. 9(10), pp. 245-255.
25. Narodna banka Srbije (2020). „Sektor osiguranja u Republici Srbiji – izveštaj za 2020. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2020.pdf
26. Narodna banka Srbije (2017). „Sektor osiguranja u Republici Srbiji – izveštaj za 2017. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2017.pdf.
27. Narodna banka Srbije (2021). „Sektor osiguranja u Republici Srbiji – izveštaj za 2020. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2021.pdf
28. Narodna banka Srbije (2022). „Sektor osiguranja u Republici Srbiji – izveštaj za 2022. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2022.pdf
29. Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS* (4th ed.). New York: Open University Press.
30. Pjanić, M., Milenković, N., Kalaš, B., Mirović, V. (2018). Profitability determinants of non-life insurance companies in Serbia. *Ekonomika preduzeća*, Vol. 66 (5-6), pp. 333-345.
31. Sambasivam, Y., Ayele, A. G. (2013). A study on the performance of insurance companies in Ethiopia. *International Journal of Marketing, Financial Services & Management Research*, Vol. 2(7), pp. 138-150.
32. Shiu, Y. (2004). Determinants of United Kingdom General Insurance Company Performance. *British Actuarial Journal*, Vol. 10(5), pp. 1079-1110.
33. Subrahmanyam, A., Titman, S. (2001). Impact of Liquidity and Profitability of Insurance Companies in Ghana, *Journal of Finance*, Vol. 56, pp. 239-241.
34. Subrahmanyam, A., Titman, S. (2001). Impact of Liquidity and Profitability of Insurance Companies in Ghana, *Journal of Finance*, Vol. 56, pp. 239-241.
35. Tatoğlu, Y. (2018). *F.Panel Veri Ekonometrisi Stata Uygulamalı*, 4. Baskı. İstanbul, Beta Basım Yayım Dağıtım, pp.5-226.

Received: 19.09.2024.
Accepted: 24.11.2024.

DOI: 10.5937/bankarstvo2403144A

ASSESSMENT OF THE PROFITABILITY OF SELECTED INSURANCE COMPANIES: THE CASE OF THE REPUBLIC OF SERBIA

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Summary: This paper aimed to examine specific factors that influence and have prognostic power on the profitability of selected insurance companies in the Republic of Serbia. Panel data were used for four insurance companies operating in the Republic of Serbia from 2013 to 2022, to estimate a linear model between the determinants that are theoretically expected to affect the performance and profitability of insurance companies. The findings of the paper revealed that company size according to all three methods (method of least squares, method of fully modified least squares, and robust method of least squares) has a significantly positive influence on the profitability of insurance companies. Also, the growth rate of the premium according to the fully modified least squares method has a positive (significant) impact on the profitability indicator, i.e. ROA. Seen from the other side, the weakest i.e., negative (significant) impact on the profitability of insurance companies in the Republic of Serbia was achieved by the independent variable expense ratio.

Keywords: Insurance companies, profitability, company size, leverage, panel regression analysis.

JEL classification: G22, L25, G23

1. Introductory Considerations

For years, insurance has been protecting people against damage caused by unwanted events such as floods, fires, car accidents, earthquakes, or storms. People transfer risks arising from adverse events to insurance companies in exchange for premiums. Insurance companies create groups through collected premiums and compensate people exposed to unwanted events from these funds. Due to its functions, insurance is a very effective way of transferring risk. By paying affordable premiums, people mitigate the negative effects of adverse events through insurance. In this way, insurance practically forces people to get rid of anxiety and make plans more courageously. Also, insurance helps entrepreneurs develop new businesses by providing security. By generating huge funds through premiums and channeling them through the financial markets, insurance funds those entities that need funds to open new or expand existing businesses. As a result, the insurance sector contributes to economic growth and prosperity (Kaya, 2015).

At the end of 2022, a total of 20 (re)insurance companies were operating in the Republic of Serbia, which is the same number as in 2021. Of the given number, 16 companies were engaged in the insurance business, while only 4 companies were engaged in the reinsurance business. Also, in 2022, insurance companies realized a total premium of about 1.1 billion euros, which is a relative increase of 12.2% compared to the previous year (National Bank of Serbia, 2022). The level of development of the insurance sector in the Republic of Serbia is significantly below the average of the EU member states. The share of the insurance sector in the total balance sheet of the financial sector of Serbia is about 6% (National Bank of Serbia, 2021).

Profitability is constantly used as a measure of financial performance. It shows how well the company has performed financially in previous periods and provides insight into the future of the company. Potential investors, lenders, current shareholders, customers, regulators, and management benefit from profitability in their analysis of the company. Potential investors, lenders, current shareholders, clients, regulators, and management benefit from profitability in their analysis of the company. For the above reasons and its importance, the profitability of insurance companies has attracted the attention of researchers in recent years. There are various measures as indicators of profitability such as return on invested assets (ROA), return on equity (ROE), technical profitability ratio, profit margin, return on invested capital (ROIC), and economic value added (EVA). All of these measures are important profitability indicators used by various stakeholders. In studies, ROA is most often used as an indicator of profitability because it is easy to obtain and not difficult to calculate.

A review of the literature on the profitability of the Serbian insurance sector showed that there is no significant number of studies on this issue despite its importance. This research aims to examine certain specific factors that influence the profitability of selected insurance companies in the Republic of Serbia. Observed factors as independent variables are examined because they are specific and characteristic of the insurance sector on the one hand, and on the other hand, they have a certain predictive influence on the profitability indicator, i.e., the return on assets of selected insurance companies. We believe that disclosure of these factors will assist insurer managers, investors, regulators, and potential policyholders in their decision-making. For this purpose, this paper seeks an answer to the question: *What factors affect the profitability of selected insurance companies in the Republic of Serbia?*

The paper is designed in five parts. The first part refers to introductory considerations with a focus on the importance of the insurance market, the goal of the research, and the questions raised in terms of the profitability of the selected insurance companies. The second part describes an overview of relevant research in the context of the influence of various factors on profitability indicators of insurance companies, and the set research hypothesis. The third part analyzes selected indicators of the insurance sector in the Republic of Serbia concerning neighboring countries, EU member states, and developed countries. The fourth part describes the chosen research methodology and the required data. The fifth part presents the obtained research results, as well as certain observations and recommendations.

2. Review of Relevant Literature

Cummins and Nini (2002) analyzed the determinants of the performance of the US insurance sector for the period 1993 to 1998. Empirical findings included a regression of capitalization performance and several other control variables, including line of business or diversification. The authors came to the conclusion that company size has a significant impact on return on assets (ROA), which is explained by the fact that larger companies generate more profit.

Adams and Buckles (2003) examined the determinants of operational performance in the insurance sector in Bermuda for the period: 1993-1997, considering 47 insurance companies. Research findings have shown that companies with high leverage and low liquidity have the best operational performance. Furthermore, company size and scope of activity do not have a substantial impact on the performance of insurance companies.

A study by Shiu (2004) examines the determinants of UK insurance company performance between 1986 and 1999. The author used a panel data set and examined 12 variables based on three key indicators: return on investment, the percentage change in shareholders' funds, and return on equity capital. The research results showed that the performance of insurance companies is positively related to the interest rate, liquidity, solvency margin, and return on capital. On the other hand, they are negatively related to inflation and reinsurance.

Kozak (2011) studied the determinants of profitability of non-life insurance companies in Poland on a sample of 25 companies. He came to the conclusion that reducing the share of car insurance in the company's portfolio, while simultaneously increasing other types of insurance has a positive impact on profitability. Also, gross domestic product (GDP) has positive implications for profitability.

Malik (2011) examines the determinants of insurance in Pakistan for the period 2005 to 2009. The research results confirm that capital size and turnover have a positive effect on the performance of insurance companies, while leverage and loss ratio have a negative effect on ROA.

Mehari and Aemiro (2013) analyzed the impact of company-specific factors on the ROA indicator for nine Ethiopian insurance companies in the period from 2005 to 2010. They concluded that the financial performance of Ethiopian insurance companies is significantly and positively influenced by company size, tangible assets, and leverage, while the loss ratio has a negative and significant impact on financial performance. The results of the study also show that company age, invoiced premium growth, and liquidity are not significantly related to financial performance.

Burca and Batrinca (2014) investigated the factors affecting the financial performance of 21 insurance

companies operating in the insurance market of Romania during the time interval from 2008 to 2012. ROA was used as an indicator of financial performance. By applying specific panel data techniques, the authors showed that the determinants of financial performance in the Romanian insurance market are: financial leverage, company size, growth of gross invoiced premium, underwriting risk, and solvency margin.

Jadi (2015) analyzed the determinants of financial performance of insurance companies based on their financial strength ratings for 57 insurance companies in the United Kingdom for the period 2006–2010. The analysis included 8 company-specific variables, namely: leverage, profitability, liquidity, size, reinsurance, growth, type of business, and organizational form. Transitional rating matrices and regression models were used in the paper. The paper establishes that profitability, liquidity, size, and organizational form are statistically significant determinants of the financial performance of insurance companies in the United Kingdom.

Pjanić et al. (2018) analyzed the profitability of non-life insurance companies in the Republic of Serbia for the period from 2010 to 2015, using multiple linear regression and independent variables: asset growth, company growth, premium growth, liquidity ratio, debt ratio, operating costs, underwriting, risk, financial leverage, and profit growth. They concluded that premium growth, debt ratio, operating costs, and profit growth have a positive and statistically significant effect on the profitability of non-life insurance companies.

Dhiab (2021) examines factors influencing profitability in the Saudi insurance sector. Empirical findings suggest that premium growth rate, intangible asset ratio, and fixed assets ratio are the main factors that positively affect the profitability of Saudi insurance companies. Furthermore, although firm size and liquidity ratio are positively correlated with profitability, their impact is not statistically significant. On the contrary, loss ratio, liability ratio, insurance leverage ratio, and to a lesser extent company size negatively affect the profitability of Saudi insurance companies.

Based on the above discussion, this paper will investigate the following hypotheses:

H1: There is a positive correlation between liquidity and profitability indicators of selected insurance companies in the Republic of Serbia.

H2: There is a negative correlation between leverage and profitability indicators of selected insurance companies in the Republic of Serbia.

H3: There is a negative correlation between the cost ratio and profitability indicators of selected insurance companies in the Republic of Serbia.

H4: There is a positive correlation between the premium growth rate and profitability indicators of selected insurance companies in the Republic of Serbia.

H5: There is a positive correlation between the growth rate of claims paid and profitability indicators of selected insurance companies in the Republic of Serbia.

H6: There is a positive correlation between company size and profitability indicators of selected insurance companies in the Republic of Serbia.

3. Analysis of Selected Indicators of the Insurance Sector in the Republic of Serbia Concerning Individual EU Member States and Developed Countries

The macroeconomic environment during the past decade has been unfavorable for the insurance sector. The main characteristics of the macroeconomic environment are reflected in the slow growth of GDP, the volume of trade and investments at the global level, extremely low and even negative interest rates, instability of financial markets, and geopolitical risks. Despite all the aforementioned volatility, the world insurance market has maintained its stability and positive growth rate. With the outbreak of the coronavirus pandemic (COVID-19) in the first quarter of 2020, the world was gripped by a deep recession with inevitable negative effects on the insurance sector as well. During the conditions of the pandemic, the insurance sector was faced with a larger volume of compensation claims, the spillover of negative economic effects, and increased operational risks (Kočović et al., 2021). In 2022, in conditions of multiple increased risks, the global insurance market recorded a real slight decline of about 0.2% with a forecast of a gradual recovery in the next two years, but still below the trend of real growth. The estimated growth of the global non-life insurance premium in 2022 was about 0.9%, where it was about 0.6% in developed countries and about 2.7% in developing countries. In contrast to the premium of non-life insurance, the premium of life insurance in 2022 recorded a real decrease of about 1.9%, whereby in developed countries the decrease amounted to about 2.8%, while in developing countries the growth was achieved by about 0.9% (National Bank of Serbia, 2022). The graph below illustrates the relative trend of changes in the total insurance premium in the Republic of Serbia for the period: 2013-2022.

Graph 1 - Relative Change in the Total Insurance Premium in the Republic of Serbia for the Period: 2013-2022 (in%)

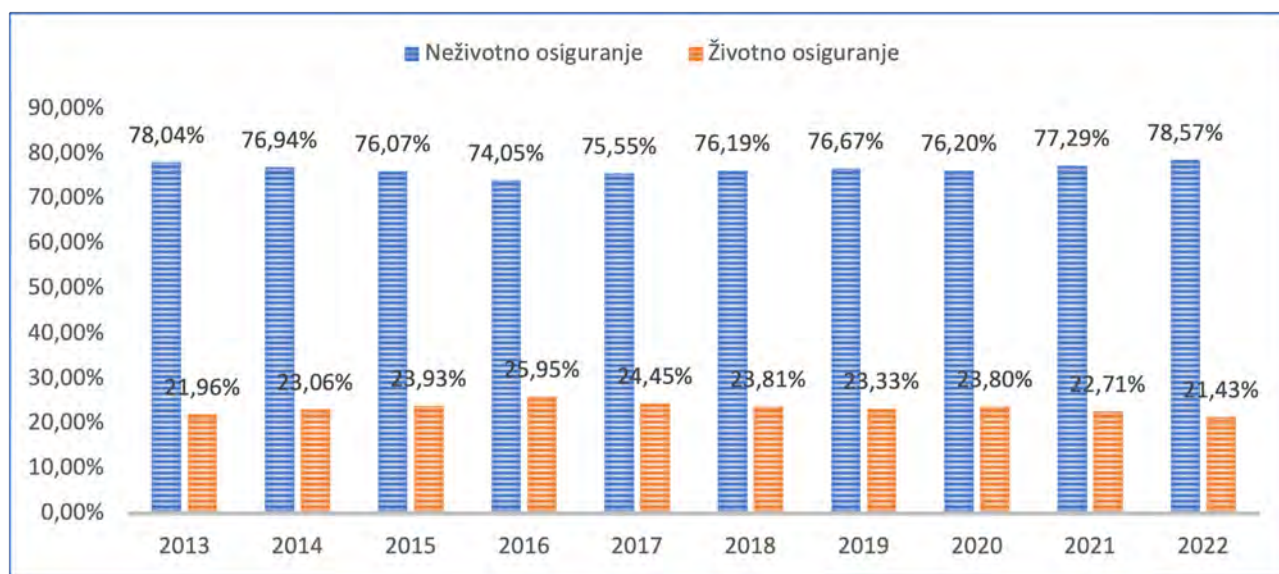


Source: Calculation by the author based on data from the National Bank of Serbia

From the previous graph can see a very variable and fluctuating pattern of movement of the total insurance premium of the Republic of Serbia for the period: 2013-2022. A slight increase in the total insurance premium is evident in two periods, with the transition from 2015 with m the previous graph can see a very variable and fluctuating pattern of movement of the total insurance premium of the

Republic of Serbia for the period: 2013-2022. A slight increase in the total insurance premium is evident in two periods, with the transition from 2015 with growth of around 17% to growth in 2017 of only 4.44%, as well as the second period with the transition from 2019 to 2020 with a slight increase compared to the previous period of only 2.29%. The estimated global growth of non-life insurance premiums in 2017 was only 3%, while in developed countries it was 2%, and in developing countries -6%. The four countries with the largest participation in the total premium on the world market in 2017 were the USA, Japan, China, and Great Britain, while the Republic of Serbia ranked 82 places in the world according to the realized premium in 2017 (National Bank of Serbia, 2017). Insurance markets in pandemic conditions have shown a certain degree of resilience. However, the estimated real growth of global premiums in developed countries was only 0,9% (National Bank of Serbia, 2020). Observed from the point of view of previous periods, the strongest relative growth of the total insurance premium was recorded with the transition from 4.19% in 2013, to about 16.60% in 2015. Graph 2 shows the relative trend of non-life and life insurance premiums in the Republic of Serbia for the period: 2013-2022.

Graph 2 - Structural Share of Non-Life and Life Insurance Premiums in Total Insurance Premiums in the Republic of Serbia for the Period: 2013 - 2022 (in%)

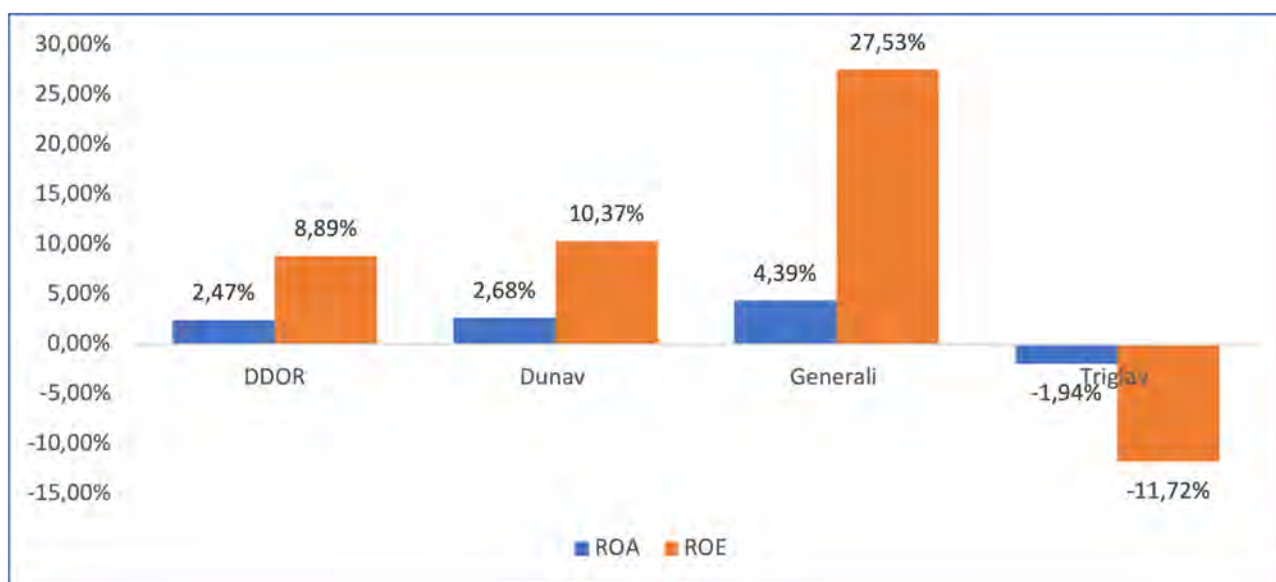


Source: Calculation by the author based on data from the National Bank of Serbia

From the previous graph, it is evident that the share of the non-life insurance premium is more significant than that of the life insurance premium. The highest relative share of the non-life insurance premium in the total insurance premium was recorded in 2022 and 2013, 78.57% and 78.04%, respectively. On the other hand, the smallest relative share of the non-life insurance premium in the total insurance premium was achieved in 2016 at around 74.05%. The average share of the non-life insurance premium in the total insurance premium was around 76%. The share of the life insurance premium in the total insurance premium had a very volatile trend. The lowest relative share of the

life insurance premium was achieved in 2022 and 2013 at 21.43% and 21.96%, respectively. In terms of the highest value, the life insurance premium reached its maximum in 2016 at about 26% of the total insurance premium. The average share of the life insurance premium in the total insurance premium was around 23%. The most significant reasons for the low share of the life insurance premium in the total insurance premium in the Republic of Serbia are the following: low paying ability of the population, low income per capita, low awareness of the population about the importance of life insurance, and expressed distrust of citizens in long-term forms of savings. Graph 3 illustrates the tendency of the average values of profitability indicators (ROA) and (ROE) of selected insurance companies (DDOR, Dunav osiguranje, Generali osiguranje, and Triglav osiguranje) of the Republic of Serbia for the period: 2013 - 2022.

Graph 3 - Average Values of Profitability Indicators ROA and ROE of Selected Insurance Companies in the Republic of Serbia for the Period: 2013. - 2022. (in %)



Source: Calculation by the author based on data from the National Bank of Serbia

The profitability of insurance companies indicates the value of the combined ratio in self-retention¹. This term explains the relationship between the sum of authorized claims and the costs of carrying out self-retention insurance against the applicable premium in self-retention. If the value of this ratio is below 100%, it indicates the ability of the insurance companies to pay the damages and cover the incurred costs from the collected premium. While viewed from the other side, if the value of this ratio is above 100%, it is assumed that when determining the amount of the premium. The company also takes into account potential income from investing in the financial market and the real estate market, in which case market risks should also be taken into account, as well as the risks of non-fulfillment of the obligations of the other contracted party (National Bank of Serbia, 2022). From the previous graph, it is evident that the insurance company Generali of all four observed insurance

¹This term explains the relationship between the sum of authorized claims and the costs of carrying out self-retention insurance against the applicable premium in self-retention.

companies achieved the highest average value of return on assets of about 4.39% and return on average capital of about 27.53%. In order to understand these relationships, and due to the lack of data for all insurance companies, we can use data from the banking market. In the banking market, if the value of ROA is greater than 2.5%, it leads to the conclusion that it is a market where a banking cartel is present, i.e. a high-risk portfolio of the observed bank or an event such as the sale of a branch. Unlike the ROA indicator, if the value of the ROE indicator is above 20-25%, the bank is using extremely large debt on the financial market (Đukić, 2011). The purpose of analyzing the mentioned profitability indicators for both insurance companies and banks is to determine the range in the movement of these indicators, and also to determine whether banks or insurance companies have healthy or bad profitability, all in terms of making business decisions. The degree of development of the state's insurance market is determined by the level of its economic development (Kočović et al., 2021). The basic indicators of the development of the insurance market are: a) insurance density - which shows the level of insurance premium per inhabitant; and b) insurance penetration - which shows the percentage share of the total invoiced insurance premium in the gross domestic product. Table 1 illustrates one of the most important indicators of the insurance market, namely the density of the insurance market, which has strong analytical power and good insight into the development of the insurance market.

Table 1 - Analysis of the Density of the Insurance Market in Developing Countries, EU Member Countries and Developed Countries for the Period: 2016 - 2020

Insurance market density (in euros)						
	2016	2017	2018	2019	2020	Average
Serbia	94	102	112	131	136	115
Croatia	278	293	324	349	349	319
Slovenia	962	1,013	1,089	1,163	1,182	1,082
Austria	1,958	1,950	1,969	2,006	2,027	1,982
Belgium	2,284	2,269	2,371	2,462	2,348	2,347
Bulgaria	143	161	190	225	225	189
Switzerland	6,477	6,349	6,332	6,397	5,835	6,278
Cyprus	901	963	1,007	1,018	1,033	984
Czech Republic	525	535	549	583	588	556
Germany	2,365	2,400	2,452	2,619	2,657	2,499
Denmark	5,111	5,411	5,524	5,639	5,972	5,531
Estonia	261	280	354	373	352	324
Spain	1,338	1,318	1,336	1,317	1,199	1,302
Finland	4,260	4,342	4,414	4,845	4,294	4,431

	2016	2017	2018	2019	2020	Average
France	3,299	3,108	3,225	3,331	2,937	3,180
Greece	366	369	377	414	405	386
Hungary	257	278	298	335	351	304
Italy	2,672	2,624	2,682	2,777	2,666	2,684
Luxembourg	43,467	45,791	47,263	64,274	56,500	51,459
Latvia	199	239	267	290	289	257
Malta	1,171	1,253	1,293	1,208	1,125	1,210
Netherlands	4,092	4,096	4,210	4,336	4,405	4,228
Norway	2,646	2,656	2,807	3,012	2,978	2,820
Poland	321	358	355	361	359	351
Portugal	1,052	1,123	1,258	1,187	964	1,117
Romania	105	110	114	126	134	118
Sweden	2,789	3,013	3,210	3,355	3,714	3,216
Slovakia	962	1,013	1,089	1,163	1,182	1,082
Turkey	64	72	84	105	123	90
Great Britain	4,038	4,504	5,182	3,902	3,709	4,267

Source: <http://www.insuranceeurope.eu> and National Bank of Serbia (Adapted by the author)

Out of a total of 30 analyzed countries (developing countries, EU member states and developed countries), the lowest average value of insurance density was recorded in the Republic of Turkey with around 90 euros of premium per inhabitant. The second lowest value of the insurance density indicator belongs to the Republic of Serbia at around 115 euros. Romania took third place in terms of the average value of the insurance density indicator of around 118 euros. For the purpose of comparison, the premium per inhabitant in the Republic of Serbia is about 9 times lower than in Slovenia, while it is about 447 times lower in comparison to Luxembourg. The level of development of the insurance sector in the Republic of Serbia is significantly below the average of EU member states. This is evidenced by the indicators of the development of the insurance market. Table 2 shows the analysis of insurance market penetration for a total of 30 analyzed countries (developing countries, EU member countries, and developed countries) for the period from 2016 to 2020.

Table 2 - Analysis of Insurance Market Penetration in Developing Countries, EU Member Countries and Developed Countries for the Period: 2016 – 2020

	2016	2017	2018	2019	2020	Average
Serbia	2.0	2.1	2.0	2.0	2.0	2.02
Croatia	2.50	2.50	2.60	2.60	2.90	2.62
Slovenia	4.9	4.9	4.9	5.0	5.4	5.02
Austria	4.8	4.6	4.5	4.5	4.8	4.64
Belgium	6.0	5.8	5.9	6.0	6.0	5.94
Bulgaria	2.1	2.2	2.4	2.6	2.6	2.38
Switzerland	8.9	8.9	9.0	8.7	7.7	8.64
Cyprus	4.0	4.1	4.1	4.1	4.4	4.14
Czech Re- public	3.1	3.0	2.8	2.8	2.9	2.92
Germany	6.2	6.1	6.1	6.3	6.6	6.26
Denmark	10.3	10.6	10.6	10.5	11.2	10.64
Estonia	1.6	1.5	1.8	1.8	1.7	1.68
Spain	5.6	5.3	5.2	5.0	5.1	5.24
Finland	10.7	10.6	10.4	11.1	10.0	10.56
France	9.9	9.1	9.2	9.2	8.7	9.22
Greece	2.2	2.2	2.2	2.4	2.6	2.32
Hungary	2.50	2.50	2.60	2.60	2.90	2.62
Italy	9.6	9.2	9.2	9.4	9.6	9.40
Luxembourg	45.7	47.6	47.4	62.1	55.2	51.60
Latvia	1.6	1.7	1.8	1.8	1.9	1.76
Malta	5.1	5.1	5.0	4.5	4.5	4.84
Netherlands	9.8	9.5	9.3	9.2	9.6	9.48
Norway	4.1	4.0	4.0	4.5	5.0	4.32
Poland	2.9	2.9	2.7	2.6	2.6	2.74
Portugal	5.8	5.9	6.3	5.7	4.9	5.72
Romania	1.2	1.2	1.1	1.1	1.2	1.16

	2016	2017	2018	2019	2020	Average
Sweden	2,789	3,013	3,210	3,355	3,714	3,216
Slovakia	962	1,013	1,089	1,163	1,182	1,082
Turkey	64	72	84	105	123	90
Great Britain	4,038	4,504	5,182	3,902	3,709	4,267

Source: <http://www.insuranceeurope.eu> and National Bank of Serbia (Adapted by the author)

Developed market economies have over 51% share of insurance premiums in GDP (for example Luxembourg). The countries that also achieved high average values of the premium share in GDP are: Great Britain (11.54%), Denmark (10.64%), Finland (10.56%) and Italy (9.40%). On the other hand, the lowest average values of the share of insurance premiums in GDP were achieved by the following economies: the Republic of Turkey (1.06%), Romania (1.16%), Estonia (1.68%), and Latvia (1.76%). In the Republic of Serbia, the average value of the penetration indicator on the insurance market was about 2.02%, which is again satisfactory with the existence of potential for improving this position.

4. Methodology and Data

4.1 Model and Econometric Methodology

Panel data refers to the pooling of observations on a cross-section of households, countries, businesses, etc., over several time periods. Panel data consists of the values of N number of units for different time periods. Therefore, panel data combines cross-sectional and time-series data. The number of units is expressed as N, while the number of periods is expressed as T (Baltagi, 2005). The advantages of panel data are increasing efficiency, controlling individual heterogeneity, providing more informative data, reducing multicollinearity problems, and establishing more comprehensive models. Limitations of panel data are the problem of short time series, the problem of data collection, and cross-sectional dependence. Panel data contains unit data, and each unit has individual characteristics. Variables that reflect the characteristics of units are called individual-specific effects. An individual-specific effect is a variable that changes in units but is fixed over time. Skills for individuals or managerial skills for companies are examples of individual effects. Each period can also have specific characteristics. The variable that reflects the characteristics of time is called a times effect, such as financial crisis, etc. A time effect is a variable that is fixed in units but changes over time (Tatoğlu, 2018). Panel regression analysis differs from cross-sectional or time-series regression because a double index is used for panel data variables:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_K X_{Kit} + \mu_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (1)$$

where i denotes units such as individuals, companies, households, countries (cross-sectional dimension), and t is a constant term. β_k is the k -th observation for K exponent variables. μ_{it} is a random error term assumed to be identically and independently distributed with zero intercept and constant variance for all time periods and units. The model used to measure the impact of company-specific factors on the profitability of selected insurance companies in the Republic of Serbia can be presented as follows:

$$ROA_{it} = \alpha + \beta_1 LIQ_{it} + \beta_2 LEV_{it} + \beta_3 ER_{it} + \beta_4 GRPR_{it} + \beta_5 GRDP_{it} + \beta_6 SIZE_{it} + \mu_{it} \quad (2)$$

$$ROE_{it} = \alpha + \beta_1 LIQ_{it} + \beta_2 LEV_{it} + \beta_3 ER_{it} + \beta_4 GRPR_{it} + \beta_5 GRDP_{it} + \beta_6 SIZE_{it} + \mu_{it} \quad (3)$$

Where: Profitability is the dependent variable measured through the ROA and ROE indicators.

LIQ - is the liquidity ratio.

LEV - leverage ratio or leverage.

ER - expense ratio.

GRPR - premium growth rate of selected insurance companies.

GRDP – growth rate of claims paid by selected insurance companies.

SIZE - represents the size of the company.

μ_{it} - random error.

If the probability is statistically significant, i.e., less than 5% should accept the set hypotheses, and on the other hand, if the probability is not statistically significant, i.e., greater than 5%, the set hypotheses should be rejected. A test of significance was performed for all variables using a test at a significance level of 95% (Chmelarova, 2007).

4.2 Data

The four subject insurance companies were selected based on their dominant market share in terms of insurance premiums on the entire insurance market in the Republic of Serbia. This research focuses on the following variables: the dependent variable will be the rate of return on assets of selected insurance companies in the Republic of Serbia (ROA), while the liquidity ratio (LIQ), leverage ratio (LEV), expense ratio (ER), growth rate premiums of selected insurance companies (GRPR), growth rate of claims paid (GRDP) and company size (SIZE) are considered as independent variables. The research covers the period from 2013 to 2022, which covers a total of 10 years. The data was collected from the official website of the National Bank of the Republic of Serbia. A summary of the variable measures is presented in Table 3. A discussion of the variable measures follows:

- **Performance:** performance is usually measured using accounting profitability, mainly return on assets (ROA) and return on equity (ROE) (Derbali and Jamel, 2014). In this paper, return on assets will be used as the dependent variable in the regression model. Therefore, ROA is measured by dividing pre-tax profit by total assets.
- **Liquidity:** the liquidity of insurance companies reflects their ability to meet short-term liabilities and claims including operating expenses and payment of benefits (Mazviona et al. 2017). Liquidity in this paper is represented by the current ratio, that is, dividing current assets by short-term liabilities.
- **Leverage ratio or leverage:** leverage is an indicator of the degree to which companies use borrowed money. In this paper, leverage is defined as the ratio of total liabilities to total capital (Almajali et al. 2012).
- **Expense ratio:** in this paper, the expense ratio is defined as the ratio between operating expenses and net earned premium.
- **Premium growth rate:** the growth perspective of insurance companies represents the percentage change in the insurance company's gross premium (Kripa and Ajasllari, 2016).

In this paper, the premium growth rate is obtained when the gross premium of the current period is divided by the premium of the previous period and multiplied by 100.

- **Growth rate of claims paid:** In this paper, the growth rate of claims paid is obtained when the claims paid in the current period are divided by the claims paid from the previous period and multiplied by 100.
- **Company size:** the size of insurance companies has been found to affect their financial performance (Malik, 2011). In this paper, the size of the company is represented by the logarithm of total assets.

Table 3 - Dependent and Independent Variables

Variable abbreviation	Variable	Calculation method
ROA	Return on assets (%)	(Profit after tax/total assets)*100
ROE	Return on equity (%)	(Profit after tax/equity)*100
LIQ	Liquidity	Current assets/Current liabilities
LEV	Leverage ratio or leverage	Total liabilities/Total equity
ER	Expense ratio	(Operating expenses/Net earned premium)*100
GRPR	Premium growth rate	Percentage change in the gross premium of the current period compared to the previous period
GRDP	Growth rate of claims paid	Percentage change in the paid claims of the current period compared to the previous period
SIZE	Company size	Logarithm of total assets

Source: Calculation by the author

5. Empirical Findings

5.1 Descriptive Statistics

The table below presents indicators of descriptive statistics of the variables used in this paper. The total number of observations is 40, which represents a relatively representative sample both from the point of view of available data on the insurance market in the Republic of Serbia and in terms of the time frame. It can be noted that the ROA for selected insurance companies in the Republic of Serbia (DDOR, Dunav osiguranje, Generali osiguranje, and Triglav osiguranje) ranges from a minimum of minus 18.0% to a maximum of 6.0% with an average of 1.90%. The highest mean value was achieved with an expense ratio of 60.98% and a growth rate of claims paid of 11.58% respectively.

In terms of the movement of the first measure of risk, i.e. the standard deviation, the following variables recorded the strongest volatility: the growth rate of claims paid 16.67% and the growth rate of premiums of around 8.17%. The following insurance companies had the largest relative increase in claims paid in 2022 compared to 2013: Generali osiguranje by about 213.68% and Triglav osiguranje by about 166.62% (National Bank of Serbia, 2022). The average premium growth is about 6.46%, which certainly indicates the perspective of this industry, especially in the life insurance segment. The liquidity ratio is almost 1 on average.

Table 4 - Descriptive Statistics Between Dependent and Independent Variants in the Model of Selected Insurance Companies of the Republic of Serbia for the Period: 2013 - 2022

	Mean	Variance	Std. Deviation	Min	Max	Skewness	Kurtosis	Number of observations
ROA	1.900	22.25	4.717	-18.00	6.00	-3.03	10.01	40
LIQ	0.989	0.058	0.241	0.37	1.42	-0.451	0.132	40
LEV	1.459	0.075	0.274	0.92	1.98	-0.131	-0.597	40
ER	60.985	24.232	4.923	52.9	73.3	0.250	-0.155	40
GRPR	6.456	66.817	8.174	-16.73	25.52	-0.464	2.069	40
GRDP	11.577	277.82	16.668	-15.34	66.60	1.07	2.04	40
SIZE	7.32	0.183	0.427	6.11	7.87	-0.756	0.309	40

Source: Calculation by the author based on data from the National Bank of Serbia

5.2 Correlation Analysis

Pallant (2010) states that correlation is very important in showing the direction and strength of continuous association between observed variables. According to Cohen (1988) if the correlation coefficient ranges from 0.10 to 0.29, then it is a small correlation. Also, if the coefficient of correlation ranges from 0.30 to 0.49, then there is a medium correlation. And if the correlation coefficient takes values from 0.50 to 1.0, then it is evident that the correlation is high. According to Asterio and Hall (2007), correlations less than 0.9 do not cause a serious problem of multicollinearity in regression analysis. Hair et al. (2010) suggest that the correlation matrix should not exceed 0.70 to guarantee that the problem of multicollinearity is not present.

Table 5 - Correlation Analysis (Pearson Coefficient of Correlation) Between the Dependent Variable and Independent Variables of Selected Insurance Companies of the Republic of Serbia for the Period: 2013 – 2022

		ROA	LIQ	LEV	ER	GRPR	GRDP	SIZE
ROA	Pearson Correlation	1.000	0.554	-0.489	-0.107	0,168	-0.120	0.570
	Sig. (2-tailed)	-	0.000	0.001	0.510	0.301	0.460	0.000
	N	40	40	40	40	40	40	40
LIQ	Pearson Correlation	0.554	1.000	-0.659	0.385	-0.066	0.052	0.439
	Sig. (2-tailed)	0.000	-	0,000	0,014	0,686	0.748	0.005
	N	40	40	40	40	40	40	40
LEV	Pearson Correlation	-0.489	-0.659	1.000	-0.371	-0.061	0.018	-0.224
	Sig. (2-tailed)	0.001	0.000	-	0.019	0.709	0.912	0.165
	N	40	40	40	40	40	40	40
ER	Pearson Correlation	-0.107	0.385	0.371	1.000	-0.039	0.280	0.292
	Sig. (2-tailed)	0.510	0.014	0.019	-	0.810	0.080	0.067
	N	40	40	40	40	40	40	40
GRPR	Pearson Correlation	0.168	-0.066	-0.061	-0.039	1.000	0.421	-0.086
	Sig. (2-tailed)	0.301	0.686	0.709	0.810	-	0.007	0.598
	N	40	40	40	40	40	40	40
GRDP	Pearson Correlation	-0.120	0.052	0.018	0.280	0.421	1.000	-0.133
	Sig. (2-tailed)	0.460	0.748	0.912	0.080	0.007	-	0.415
	N	40	40	40	40	40	40	40
SIZE	Pearson Correlation	0.570	0.439	-0.224	0.292	-0.086	-0.133	1.000
	Sig. (2-tailed)	0.000	0.005	0.165	0.067	0.598	0.415	-
	N	40	40	40	40	40	40	40

Source: Calculation by the author based on data from the National Bank of Serbia

It is evident from the previous table that the strongest positive correlation with the dependent variable, i.e., return on assets (ROA) was achieved by the following independent variables: the size of insurance companies (0.570) and the liquidity of insurance companies at significance ($p < 0.05$). According to Subrahmanyam and Titman (2001), liquidity improves the financial performance of a company's operations. Insurance companies with more liquid assets are less likely to fail because they can earn money in times of need and therefore outperform institutions with less liquid assets.

Browne et al. (2001) found evidence that supports the thesis that performance is positively correlated with the percentage of liquid assets in the asset structure of insurance companies. Liargovas and Skandalis (2008) came to the conclusion that greater liquidity enables the company to deal with unpredictable situations and fulfill its obligations during periods of low profits. On the other hand, the most significant negative correlation was recorded between leverage and return on assets (-0.489) at a significance level of less than 5%.

Table 6 - Summary Correlation Statistics Between Dependent and Independent Variables of Selected Insurance Companies in the Republic of Serbia for the Period: 2013-2022

Dependent variables	R	R ²	Adjusted R ²	Standard error of estimate	Durbin - Watson statistics
ROA	0.836	0.700	0.646	2.81339	2.497
ROE	0.747	0.559	0.479	17.1470	2.997

Source: Calculation by the author based on data from the National Bank of Serbia

From the previous table, it is evident that the adjusted coefficient of determination is 64,60%, which means that the independent variables predict the first dependent variable, i.e. ROA in a given amount, while the second variable, i.e. ROE, predicts with about 47,90%. The values obtained in terms of the Durbin-Watson statistic are slightly different. Both one and the other dependent variable had values greater than 2 and less than 3, which leads to the conclusion that it is a positive serial correlation.

5.3 Assessment Results

Panel regression methods (the method of least squares, the method of fully modified least squares, and the robust method of least squares) were chosen because, on the one hand, they have very good predictive power and discrimination of independent variables on dependent variables, and on the other hand, they reduce the degree of multicollinearity. The results of the analysis show that the value of the adjusted coefficient of determination in the least squares method is about 64.63%, which explains the influence of the selected independent variables on the dependent variable in the model. In contrast to the method of least squares, the adjusted coefficient of determination in the method of modified least squares reached a value of about 64.21%, which is almost at the same level as in the method of least squares. On the other hand, the lowest value of the coefficient of determination was recorded with the robust least squares method of only 17.09%, which explains the influence of the independent variables on the dependent variable in the model. Also, the F-statistic value of the least squares method is high (12.877) and the probability is equal to zero, which indicates that the model is very significant.

Table 7 - Coefficients of Independent Variables Under Multiple Least Squares Regression, Fully Modified Least Squares and Robust Least Squares for the Period: 2013 - 2022

Regression model	Least squares method			Method of fully modified least squares			Robust least squares method		
Dependent variable - ROA									
Independent variables	Coeff.	Std. Error	Probability	Coeff.	Std. Error	Probability	Coeff.	Std. Error	Probability
C	8.861	2.199	0.0003	8.061	1.895	0.0002	1.835	1.359	0.176
LIQ	0.049	0.033	0.1420	0.048	0.028	0.0988	0.011	0.020	0.577
LEV	-0.059	0.027	0.0390	-0.061	0.024	0.0157	-0.018	0.017	0.274
ER	-1.29E-05	3.09E-06	0.0002	-1.18E-05	2.66E-06	0.0001	-2.69E-06	1.91E-06	0.0002
GRPR	0.001	0.0006	0.0962	0.0013	0.00056	0.0196	-0.0002	0.0003	0.459
GRDP	8.19E-06	0.0003	0.9809	-7.37E-05	0.0002	0.8040	0.0003	0.0002	0.139
SIZE	0.059	0.0126	0.000	0.0605	0.0109	0.0000	0.0186	0.0078	0.0172
Coefficient of determination	0.7007			0.6986			0.1709		
Pseudo coefficient of determination	-			-					
Adjusted coefficient of determination	0.6463			0.6421			0.0202		
F-Statistics	12.877			-			-		
Probability (F-statistic)	0.0000			-			-		
Probability (Rn-statistics)	-			-			-		
Prob (Quasi-LR statistics)	-			-			-		

Source: Calculation by the author

By testing the first research hypothesis that liquidity has a positive influence on the first dependent variable, i.e., return on assets - ROA, the research results point to the conclusion that with all three methods, we have a positive value of the coefficient, but with a probability greater than 5%. In this regard, we reject the first research hypothesis that liquidity has a positive influence on the first dependent variable, i.e., ROA. In all three observed models, a negative correlation was recorded between leverage and return on assets of observed insurance companies. However, the largest negative impact was recorded with the method of fully modified least squares with a significance less than 5% (0.0157) as well as with the least squares method with a significance also less than 5% (0.0390). Therefore, with the method of fully modified least squares, this practically means that if indebtedness increases by about 1%, the return on assets will decrease by about 0.061 units, assuming that other variables remain unchanged. Insurance companies should pay close attention to leverage because companies that have multiple leverage may be at risk of bankruptcy if they are unable to pay off their debt, and may also be unable to find new lenders in the future. On the other hand, borrowing can increase shareholders' returns on their investments and make good use of the tax benefits associated with borrowing (Kaguri, 2013). Also, insurance companies with high leverage are forced to limit their profitability. Therefore, we come to the conclusion that we reject the second research hypothesis that there is a negative correlation between leverage and profitability indicators of selected insurance companies.

Between expense ratio and the first indicator of profitability i.e. ROA has a negative correlation with all three methods with a probability of less than 5%. In this regard, we can come to the conclusion that we accept the third research hypothesis that there is a negative causality between the expense ratio and ROA indicators of selected insurance companies.

By testing the fourth research hypothesis that the premium growth rate has a positive impact on profitability, we come to the conclusion that with the first two methods (the least squares method and the fully modified least squares method) we have a positive correlation but with different probabilities. Therefore, only with the method of fully modified least squares, we have a probability of less than 5%. Based on the probability values of all three methods, we come to the conclusion that we reject the fourth research hypothesis that the premium growth rate has a positive impact on the ROA indicator.

By examining the fifth research hypothesis that the growth rate of claims paid has a positive impact on the profitability indicator (ROA), it is concluded that the least squares method and the robust least squares method have a positive correlation with a probability greater than 5%. With the fully modified least squares method, there is a negative correlation between the growth rate of claims paid and ROA with a probability greater than 5%. Therefore, we come to the conclusion, after rejecting the fifth research hypothesis, that there is a positive correlation between the growth rate of claims paid and ROA.

Also, a positive correlation was achieved between the size of the selected insurance companies in Serbia and the return on assets in all three-panel regression models, with a slight advantage in the least squares method with a coefficient value of 0.06 and a significance of 0.000, which is considered strong significance. This confirms the sixth research hypothesis that the size of companies has a positive influence on the first dependent variable, i.e., ROA. The positive relationship between company size and the ROA indicator means that size is used to capture the fact that larger insurance companies make better use of economies of scale in transactions and enjoy higher levels of profit. Similar conclusions were obtained according to the results of the study by Sambasivam and Ayela (2013). The study also recommends a high consideration of increasing the assets of the companies, for the reason that the size of the companies is an important factor because it affects competitive power.

Small companies have less power than large ones and it is more difficult for them to compete with large companies, especially in highly competitive markets. Also, it is very important that insurers should evaluate the possibilities of mergers and acquisitions to become bigger.

Table 8 illustrates the influence of independent variables on the dependent variable (ROE) using the least squares method, the fully modified least squares method, and the robust least squares method for the period: 2013-2022.

The obtained results of the analysis (table 8) show that the value of the adjusted coefficient of determination with the method of least squares is about 47.90%, which explains the prediction of the selected independent variables on the dependent one in the model, i.e. return on equity (ROE). In contrast to the method of least squares, the adjusted coefficient of determination in the method of modified least squares reached a value of about 47.40%, which is almost at the same level as in the method of least squares. On the other hand, the lowest value of the coefficient of determination was recorded with the robust least squares method of only 17.70%, which explains the influence of the independent variables on the dependent variable in the model. Also, the F-statistic value for the least squares method is 6.984 and the probability is equal to zero, which indicates that the model is very significant.

Table 8 - Coefficients of Independent Variables Under Multiple Regression of Least Squares, the Method of Fully Modified Least Squares and the Robust Method of Least Squares for the Period: 2013 - 2022

Regression model	Least squares method			Method of fully modified least squares			Robust least squares method		
Dependent variable - ROE									
Independent variables	Coeff.	Std. Error	Probability	Coeff.	Std. Error	Probability	Coeff.	Std. Error	Probability
C	44.434	13.410	0.002	38.799	7.856	0.000	7.775	5.126	0.129
LIQ	0.115	0.201	0.569	0.094	0.119	0.433	0.243	0.077	0.002
LEV	-0.220	0.168	0.199	-0.209	0.099	0.043	0.004	0.064	0.952
ER	-6.53E-05	1.88E-05	0.001	-5.73E-05	1.10E-05	0.000	-1.18E-05	7.20E-06	0.001
GRPR	0.004	0.004	0.323	0.005	0.002	0.030	-0.001	0.001	0.856
GRDP	0.001	0.002	0.653	0.001	0.001	0.821	0.001	0.001	0.348
SIZE	0.345	0.077	0.000	0.340	0.045	0.000	0.072	0.029	0.014

Regression model	Least squares method			Method of fully modified least squares			Robust least squares method		
Dependent variable - ROE									
Independent variables	Coeff.	Std. Error	Probability	Coeff.	Std. Error	Probability	Coeff.	Std. Error	Probability
Coefficient of determination	0.559			0.557			0.304		
Pseudo coefficient of determination	-			-			-		
Adjusted coefficient of determination	0.479			0.474			0.177		
F-Statistics	6.984			-			-		
Probability (F-statistic)	0.000			-			-		
Probability (Rn-statistics)	-			-			-		
Prob (Quasi-LR statistics)	-			-			-		

Source: Calculation by the author

The obtained results of the prediction of independent variables on the dependent variable, i.e., return on equity, are almost identical to the results of the influence of independent variables on the first dependent variable, i.e., return on assets, with the difference that with the robust method of least squares, the influence of liquidity is positive and with a significance of less than 5%, which implies to the overall conclusion that the first research hypothesis that liquidity has a positive effect on the second dependent variable, i.e. ROE, is rejected. As for the independent variable of leverage, we have a negative correlation with the dependent variable ROE and a probability of 0.04 using the method of fully modified least squares. With the least squares method, we also have a negative correlation but a significance greater than 5%. With the robust least squares method, we also have a positive correlation of leverage with the dependent variable ROE and a significance significantly greater than 5%. Based on the given results, we can reject the second research hypothesis that leverage is negatively correlated with the ROE indicator. With all three methods (the least squares method, the fully modified least squares method, and the robust least squares method) we have a negative correlation between expense ratio and the other dependent variable ROE, but with different significance. With all three methods (the method of least squares, the method of fully modified least squares, and the robust method of least squares) we have a probability of less than 5% between the expense ratio and the ROE indicator. In this regard, we can conclude that we accept the third research hypothesis that the expense ratio is negatively correlated with the second dependent variable, i.e. ROE. By testing the fourth research hypothesis that the premium growth rate has a positive impact on profitability, we conclude that with all three methods we have a positive correlation,

but with different probabilities. Therefore, only with the fully modified least squares method we have a probability of less than 5%, which implies the conclusion that we reject the fourth research hypothesis that the premium growth rate has a positive impact on the ROE indicator. In terms of testing the fifth research hypothesis that the growth rate of paid damages has a positive effect on the second dependent variable, i.e. ROE, we conclude that with all three methods we have a positive correlation, but with a probability greater than 5%. Therefore, the given results point to the conclusion that the fifth research hypothesis that the growth rate of paid claims has a positive correlation with the second dependent variable ROE is not accepted. And by testing the last research hypothesis that the size of the company has a positive correlation with the second dependent variable, i.e. ROE, we can conclude that with all three methods there is a positive correlation, and the probability is less than 5%. In this regard, we come to a new conclusion that the sixth research hypothesis is accepted, that company size has a positive influence on the ROE of selected insurance companies in the Republic of Serbia.

Table 9 - Summary of Research Results

Hypotheses	Expected correlation	Empirical result
H1: There is a positive correlation between liquidity and profitability indicators of selected insurance companies in the Republic of Serbia.	+	The first research hypothesis was rejected.
H2: There is a negative correlation between leverage and profitability indicators of selected insurance companies in the Republic of Serbia.	-	The second research hypothesis was rejected.
H3: There is a negative correlation between expense ratio and profitability indicators of selected insurance companies in the Republic of Serbia.	-	The third research hypothesis was fully accepted.
H4: There is a positive correlation between the premium growth rate and profitability indicators of selected insurance companies in the Republic of Serbia.	+	The fourth research hypothesis was rejected.
H5: There is a positive correlation between the growth rate of claims paid and profitability indicators of selected insurance companies in the Republic of Serbia.	+	The fifth research hypothesis was rejected.
H6: There is a positive correlation between company size and profitability indicators of selected insurance companies in the Republic of Serbia.	+	The sixth research hypothesis was fully accepted.

Source: Calculation by the author

Concluding Remarks

The global insurance market is developing dynamically and spatially and temporally unevenly, under the influence of a large number of factors. Insurance has been an effective way of protecting against risk for years. Insurers must ensure a certain level of profitability to continue with their activities and

fulfill their obligations. For this reason, it is important to study the factors that affect the profitability of insurance companies. This paper aimed to empirically examine the specific factors that influence the profitability of selected insurance companies in the Republic of Serbia, as measured by ROA and ROE indicators. The panel analysis is based on a set of data for four leading insurance companies in the Republic of Serbia in the period from 2013 to 2022, based on the annual reports of the observed insurance companies.

Factors that have been identified as having a significant impact on the profitability indicators of the selected insurance companies are the size of the company and the expense ratio. The coefficients obtained in this paper through panel regression models show that liquidity does not have a completely statistically significant prediction on the second profitability indicator ROE, thereby rejecting the first research hypothesis.

By testing the second research hypothesis, the results of the analysis showed that in all three observed methods, a negative correlation was recorded between leverage and return on assets of the observed insurance companies, but with different significance. Significance of less than 5% was recorded with the method of fully modified least squares, as well as with the method of least squares. The influence of leverage on the second dependent variable, i.e. ROE, with the least squares method and the fully modified least squares method has a negative correlation, while with the robust least squares method, a positive correlation was recorded. Comprehensively observed in terms of the movement of probability values, the conclusion is that the second research hypothesis is rejected.

The results of the presented models show that there is a negative correlation between the expense ratio and the dependent variables in the model (ROA and ROE), with satisfactory significance in terms of probability. Based on the obtained results, we came to the conclusion that the expense ratio has a negative effect on profitability indicators, and the third research hypothesis is fully accepted.

The results of testing the fourth research hypothesis showed that the premium growth rate has a positive impact on profitability in the least squares method and the fully modified least squares method, but with different probabilities. Therefore, only with the fully modified least squares method we have a probability of less than 5%, which points to the conclusion to reject the fourth research hypothesis.

By testing the fifth research hypothesis, the results of the analysis showed that with the observed methods, both positive and negative coefficient values were recorded between the growth rate of the claims paid and the profitability indicator with significance above 5%, which implies the conclusion to reject the fifth research hypothesis.

The results of the presented models show that there is a positive correlation between the size of the company and the dependent variables in the model (ROA and ROE), with probability values below 5%, which leads to the conclusion that the size of the company has a positive significant impact on profitability performance, which fully accepts the sixth research hypothesis.

Even though the results of the given models (except for the fully modified least squares model) do not show that insurance premium growth is an important factor in profitability, and bearing in mind that the life insurance market in Serbia is still underdeveloped, in the future special attention should be paid to the growth potential of this market by contemporary market conditions marked by numerous demographic, political, social and economic changes. Insurance companies in Serbia should pay more attention to the obtained significant factors considering their important role in predicting and influencing their financial performance and success.

The limitation of this research, which refers to the analysis of the influence of independent variables on the profitability indicators of selected insurance companies of the Republic of Serbia, is reflected in the non-transparency of data in the context of life insurance products, which is why we were not able to analyze the profitability of individual life insurance products. Also, a wider choice of variables and an increase in the sample of insurance companies from the countries of the Western Balkans can be a limitation as well as a recommendation for further research.

References

1. Adams, M., Buckle, M. (2003). The determinants of corporate financial performance in the Bermuda insurance market. *Applied Financial Economics*, Vol. 13(2), pp. 133-143.
2. Almajali, A. Y., Alamro, S. A., Al-Soub, Y. Z. (2012). Factors affecting the financial performance of Jordanian insurance companies listed at Amman Stock Exchange. *Journal of Management research*, Vol. 4(2), pp. 266-289.
3. Asteriou, D., Hall, S. G. (2007). *Applied Econometrics: a modern approach*, revised edition. Hampshire: Palgrave Macmillan.
4. Baltagi, B.H. (2005). *Econometric Analysis of Panel Data*, Third edition. John Wiley & Sons, Ltd.
5. Browne, R., Janney, J., Paul, K., Muralidhar, K., Ruff, B. (2001). An Empirical Investigation of the Stakeholder Theory Perspective, *Journal of Business Ethics*, Vol. 32 (2), pp. 143-156.
6. Burca, A.M., Batrinca, G. (2014). "The determinants of financial performance in the Romanian insurance market" *International Journal of Academic Research in Accounting, Finance and Management Sciences*, Vol. 4(1), pp. 299-308.
7. Cohen, J.W. (1988). *Statistical power analysis for the behavioral sciences* (2nd edn). Hillsdale, NJ: Lawrence Erlbaum.
8. Chmelarova, V. (2007). The Hausman test and some alternatives, with heteroskedastic data. M.S. Louisiana State University, USA.
9. Cummins, J. D., Nini, G. P. (2002). Optimal capital utilization by financial firms: Evidence from the property-liability insurance industry. *Journal of Financial Services Research*, Vol. 21, pp. 15-53.
10. Derbali, A., Jamel, L. (2014). Determinants of performance of Tunisia insurance companies: Case of life insurance. *International Journal of Innovation and Applied Studies*, Vol. 6(1), pp. 90-96.
11. Dhiab, L.B. (2021). Determinants of Insurance Firms' Profitability: An Empirical Study of Saudi Insurance Market, *Journal of Asian Finance, Economics and Business*. Vol 8 No 6 (2021) pp. 235-243.
12. Đukić, Đ. (2011). *Upravljanje rizicima i kapitalom u bankama*. Centar za izdavačku delatnost Ekonomskog fakulteta u Beogradu: Beograd.
13. Hair Jr. J. F., Black, J. W., Babin, B. J., Anderson, E. R. (2010). *Multivariate Data Analysis* (Seventh). Edinburgh: Pearson Education Limited.
14. Jadi, D. M. (2015). *An empirical analysis of determinants of financial performance of insurance companies in the United Kingdom*. Ph.D. thesis, University of Bradford.

15. Kaguri, A. W. (2013). Relationship between firm characteristics and financial performance of life insurance companies in Kenya. Unpublished M. Sc. Thesis, University of Nairobi, Kenya.
16. Kaya, Ö. E., Kaya, B. (2015). Türkiye’de Hayat Sigortası Şirketlerinin Finansal Performansını Belirleyen Firmaya Özgü Faktörler: Panel Veri Analizi. *Finansal Araştırmalar ve Çalışmalar Dergisi*, 7(12):93.
17. Kočović, J., Antić-Rakonjac, T., Koprivica, M., Šulejić, P. (2021). Osiguranje u teoriji i praksi. Univerzitet u Beogradu - Ekonomski fakultet. Centar za izdavačku delatnost. Beograd.
18. Kozak, S. (2011). Determinants of profitability of non-life insurance companies in Poland during integration with the European financial system. *Electronic Journal of Polish Agricultural Universities*, 14(1), pp. 1-9.
19. Kripa, D., Ajasllari, D. (2016). Factors affecting the profitability of Insurance Companies in Albania. *European Journal of Multidisciplinary Studies*, Vol. 1(1), pp. 352-360.
20. Liargovas, P., Skandalis, K. (2008). Factor affecting firms financial performance, The Case of Greece, University of Peloponnese.
21. Malik, H. (2011). Determinants of insurance companies’ profitability: An analysis of insurance sector of Pakistan. *Academic Research International*, Vol. 1(3), p. 315.
22. Malik, H. (2011). Determinants of insurance companies profitability: An analysis of insurance sector of Pakistan. *Academic Research International*, Vol. 1(3), pp.315-321.
23. Mazviona, B. W., Dube, M., Sakahuhwa, T. (2017). An Analysis of Factors Affecting the Performance of Insurance Companies in Zimbabwe. *Journal of Finance and Investment Analysis*. Vol. 6(1), pp.11-30.
24. Mehari, D., Aemiro, T. (2013). “Firm specific factors that determine insurance companies’ performance in Ethiopia”. *European Scientific Journal*, Vol. 9(10), pp. 245-255.
25. Narodna banka Srbije (2020). „Sektor osiguranja u Republici Srbiji – izveštaj za 2020. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2020.pdf
26. Narodna banka Srbije (2017). „Sektor osiguranja u Republici Srbiji – izveštaj za 2017. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2017.pdf.
27. Narodna banka Srbije (2021). „Sektor osiguranja u Republici Srbiji – izveštaj za 2020. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2021.pdf
28. Narodna banka Srbije (2022). „Sektor osiguranja u Republici Srbiji – izveštaj za 2022. godinu“. Dostupno na: https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2022.pdf
29. Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS* (4th ed.). New York: Open University Press.
30. Pjanić, M., Milenković, N., Kalaš, B., Mirović, V. (2018). Profitability determinants of non-life insurance companies in Serbia. *Ekonomika preduzeća*, Vol. 66 (5-6), pp. 333-345.
31. Sambasivam, Y., Ayele, A. G. (2013). A study on the performance of insurance companies in Ethiopia. *International Journal of Marketing, Financial Services & Management Research*, Vol. 2(7), pp. 138-150.
32. Shiu, Y. (2004). Determinants of United Kingdom General Insurance Company Performance. *British Actuarial Journal*, Vol. 10(5), pp. 1079-1110.
33. Subrahmanyam, A., Titman, S. (2001). Impact of Liquidity and Profitability of Insurance Companies in Ghana, *Journal of Finance*, Vol. 56, pp. 239-241.

34. Subrahmanyam, A., Titman, S. (2001). Impact of Liquidity and Profitability of Insurance Companies in Ghana, *Journal of Finance*, Vol. 56, pp. 239-241.
35. Tatoğlu, Y. (2018). *F.Panel Veri Ekonometrisi Stata Uygulamalı*, 4. Baskı. İstanbul, Beta Basım Yayım Dağıtım, pp.5-226.

Datum prijema: 06.11.2024. god.
Datum prihvatanja: 29.11.2024. god.

DOI: 10.5937/bankarstvo2403194M

KLJUČNI INDIKATORI ZELENE TRANZICIJE: PRIMER SRBIJE

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„Zelena tranzicija predstavlja težak izazov za kreatore politika, jer su posledice neuspeha značajne, dok je put do uspeha tako složen.“

Christine Lagarde, Predsednica Evropske centralne banke

Govor „Ka uređenoj energetske tranziciji“, Pariz, 29. septembar 2023.

Rezime: Srbija, kao i skoro svaka druga zemlja na svetu, sprovodi strategiju zelene tranzicije kako bi stvorila nisko-karbonsku ekonomiju zasnovanu na ciljevima održivosti. Kao rezultat, uspostavljen je sistem koji će rasti i razvijati se principima zaštite životne sredine uz poštovanje društvenih i ekonomskih aspekata poslovanja. Cilj rada jeste procena ključnih indikatora zelene tranzicije na primeru Srbije. Konkretno, posmatraćemo indeks zelenog rasta, indikatore većeg korišćenja zelene energije i emitovanje zelenih finansijskih instrumenata. Ova tri indikatora su odabrana da pokažu napredak Srbije ka održivom razvoju i zelenoj tranziciji, što je ključno za primenu strategija prilagođavanja i ublažavanje efekata klimatskih promena. U pogledu metodologije, analiza Sarkodie et al. (2023) nam je poslužila za izradu zelenog indeksa na podacima za Srbiju. Uprava za javni dug Ministarstva objavljuje podatke o emitovanju zelenih finansijskih instrumenata, dok Elektroprivreda Srbije objavljuje podatke za analizu energetske tranzicije. Prema analizi, Srbija je ostvarila značajan napredak u pogledu analiziranih indikatora zelene tranzicije.

Ključne reči: zelena tranzicija, ključni indikatori, indeks zelenog rasta, tranzicija zelene energije, zeleni finansijski instrumenti.

JEL klasifikacija: O44, Q01, Q54, Q58

**Za stavove iznete u ovom radu odgovoran je autor i stavovi ne predstavljaju nužno zvaničan stav Udruženja ekonomista Beograd.*

Uvod

Republika Srbija, kao i većina drugih zemalja, primenjuje održive poslovne strategije i tehnologije kako bi podstakla ekonomski rast uz minimiziranje negativnih uticaja na životnu sredinu. Ključni indikatori, kao što su procenat obnovljivih izvora energije u ukupnoj proizvodnji električne energije, emisije gasova staklene bašte, upravljanje otpadom, indikatori biodiverziteta, ulaganja u zelenu tehnologiju i otvaranje zelenih radnih mesta, neophodni su za praćenje napretka u zelenoj tranziciji. Kako bi pratila zelenu tranziciju, svaka zemlja treba da izabere dovoljan skup ključnih indikatora koji su prilagođeni jedinstvenoj ekonomskoj strukturi date zemlje, ekološkim problemima i izvorima proizvodnje električne energije. U ovom radu, na primeru Srbije, analiziraćemo ključne indikatore zelene tranzicije. Konkretno, sagledaćemo indeks zelenog rasta, tranziciju ka većoj upotrebi zelene energije i emitovane zelene instrumente. Praćenje ovih indikatora pružiće nam temeljno razumevanje pristupa Srbije ka postizanju održivog razvoja, do sada postignutih rezultata i oblasti koje zahtevaju dalju pažnju.

Sledeća istraživačka pitanja (eng. *Research questions* – RQ) su zastupljena u ovom radu:

RQ 1: Koji je optimalni indeks zelenog rasta za Republiku Srbiju?

RQ 2: Koje inicijative je Republika Srbija preduzela za povećanje učešća obnovljivih izvora energije?

RQ 3: Koje zelene finansijske instrumente i pod kojim okolnostima je do sada emitovala Republika Srbija?

Ovaj rad je strukturiran na sledeći način: Nakon uvoda sledi pregled relevantne literature. Analiza metodologije istraživanja i prezentacija izvora podataka koji se koriste za analizu tranzicije zelene energije i emitovanih instrumenata zelenog finansiranja, kao i formiranje indeksa zelenog rasta Republike Srbije, primarne su teme drugog dela rada. U zaključku ćemo sumirati najvažnije nalaze rada.

Pregled literature

Zelena transformacija je postala jedan od glavnih pravaca budućeg razvoja na globalnom nivou i obuhvata razvoj zelene tehnologije i primenu propisa koji će omogućiti primenu ekološki prihvatljivih rešenja. Dakle, zelena transformacija podrazumeva ekonomski rast koji kombinuje zaštitu životne sredine sa očuvanjem životnog standarda za sadašnje i buduće generacije, kao i racionalno korišćenje raspoloživih prirodnih resursa (Cheba et al., 2022 i Acosta et al., 2020). Cilj postizanja zelene ekonomije je zaštita životne sredine i očuvanje interesa svih članova društva. Važni elementi te transformacije uključuju ekološku sertifikaciju, ekološku reviziju i druge aktivnosti (Vukovic et al., 2019). Za merenje napretka u postizanju zelene tranzicije neophodno je imati ključne indikatore koji će služiti za merenje napretka u postizanju ciljeva održivog rasta i razvoja. Prilikom izbora ključnih indikatora koje će svaka država pratiti, potrebno je uzeti u obzir karakteristike same privrede kako bi se razvila adekvatna metodologija za njihovo praćenje, zatim je potrebno izabrati one indikatore koji imaju visok stepen granularnosti, što je posebno važno kada je u pitanju izveštavanje o rezultatima i konačno je potrebno izvršiti adekvatno strukturiranje izveštaja i razviti neophodne standarde izveštavanja koji će omogućiti automatsko praćenje odabranih ključnih indikatora.

Postizanje zelene ekonomije jedan je od ključnih ciljeva formalno usvojenih na Konferenciji Ujedinjenih nacija o održivom razvoju održanoj u Rio de Žaneiru 2012. godine (Timonen et al., 2021). Razvoj u primeni koncepta održivosti i dostupnost novih podataka zahtevaju stalnu proveru seta indikatora koji će na najbolji način meriti nivo društvenog blagostanja (Rotondo et al., 2022). Na globalnom nivou, Ujedinjene nacije su u Agendi za održivi razvoj 2030 objavile ciljeve održivog razvoja za period 2016-2030, koji obuhvataju 17 ciljeva i 169 ciljeva za njihovu implementaciju. Time je na globalnom nivou uspostavljen set indikatora

koji odražavaju ideologiju održivog razvoja i stvaraju ravnotežu između društvenih, ekonomskih i prioriteta očuvanja životne sredine (Dahaeva i Amirova, 2023).

Važan doprinos analizi koncepta zaštite životne sredine, društvene odgovornosti i korporativnog upravljanja (eng. *Environmental, Social and Governance - ESG*) dale su međunarodne organizacije poput Organizacije za ekonomsku saradnju i razvoj i Ujedinjene nacije. Fokus analize u izveštaju „*ESG Investing: Environmental Pillar Scoring and Reporting*“ Organizacije za ekonomsku saradnju i razvoj je kako izmeriti uticaj u okviru dela E (eng. *Environmental*) koncepta ESG kako bi se na bolji način razumeli izlazni efekti kao što su emisije ugljen-dioksida, ali i negativan uticaj određenih ekonomskih aktivnosti na životnu sredinu. Time ova analiza može da koristi boljem razumevanju da li stub u okviru dela E (eng. *Environmental*) može da na adekvatan način pomogne tržištima i investitorima, koji poštuju koncept ESG ulaganja, kako bi povećali otpornost svog portfelja na prisustvo fizičkog rizika i na sprovođenje klimatske tranzicije. U izveštaju iz 2022. godine, pod nazivom „*ESG ratings and climate transition*“ Organizacija za ekonomsku saradnju i razvoj je ukazala na oblasti u kojima se može poboljšati deo E (eng. *Environmental*) koncepta ESG kako bi se ispunili ciljevi prelaska na nisko-karboničnu ekonomiju i time pružila podrška međunarodnim naporima u sprovođenju zelene tranzicije. Ovaj izveštaj posebno ukazuje na značaj efikasnog praćenja napretka u procesu tranzicije na nisko-karboničnu ekonomiju od strane svih tržišnih učesnika. U godišnjem izveštaju o globalnoj korporativnoj održivosti za 2024. godinu Organizacija za ekonomsku saradnju i razvoj ukazuje da značaj analize o primenjenim strategijama održivosti širom sveta. Analiza se bazira na prikazu principa korporativnog upravljanja, zatim obelodavanje podataka o održivosti, ali i ukazuje na neophodnost da postoji efikasan dijalog između svih zainteresovanih strana poput upravnog odbora i akcionara.

Ujedinjene Nacije su u izveštaju o ciljevima održivog razvoja za 2023. godine predstavile sveobuhvatan prikaz napretka ka postizanju 17 ciljeva održivog razvoja, čime su istakli uspehe, ali i izazove sa kojima se zemlje suočavaju u postizanju održivog razvoja. Kako bi se postigao napredak u postizanju ciljeva održivog razvoja Ujedinjene nacije su u Izveštaju o globalnom održivom razvoju za 2023. godinu istakle ključne transformacije koje je neophodno primeniti u različitim sektorima kroz struktuiran i sistemski pristup. Te ključne transformacije se odnose na ljudsko blagostanje, stvaranje održive i pravedne ekonomije, uspostavljanje sistema zdrave ishrane i primenu dekarbonizacije u proizvodnji energije. Navedeni izveštaji Ujedinjenih nacija ukazuju na posvećenost koju ova organizacije posvećuje unapređenju principa ESG na globalnom nivou, uz istovremeno uspostavljanje okvira da se postigne održivi razvoj.

Iz perspektive analize Evropske komisije (2009), ključni indikatori u oblasti primene ESG mogu se podeliti na opšte ESG, koji se odnose na oblasti o kojima sve kompanije treba da izveštavaju (kao što je energetska efikasnost) i specifični ESG, koji predstavljaju oblasti o kojima izveštavaju kompanije iz određene industrije (na primer skladištenje otpada u vezi sa industrijama kao što su proizvodnja gasa i hemikalija). ESG kriterijumi predstavljaju set standarda koje banke i drugi investitori razmatraju ukoliko imaju težnju da ulažu novac u ekološke i društveno korisne projekte (Petrović Tomić, 2023).

Franco et al. (2023) ističu važnost praćenja energetske indikatora u cilju praćenja energetske tranzicije i ukazuju na to da je neophodno okarakterisati energetska sastav svake pojedinačne industrije kako bi se kreirao energetska miks koji podržava zelenu tranziciju. Autori ukazuju da energetska efikasnost zavisi od mogućnosti korišćenja obnovljivih izvora energije, njihove dostupnosti i brzine implementacije. Prelazak na održivo društvo i neutralnost ugljenika od 2050. godine zahteva značajno korišćenje obnovljivih izvora energije, što značajno utiče na stabilnost postojeće energetske mreže (Airò Farulla et al., 2021). Ryszawska (2014) u svojoj analizi ukazuje na značaj praćenja globalnog indeksa zelene ekonomije, koji predstavlja

sinte- tički pristup za praćenje stepena ostvarenosti zelene ekonomije na globalnom nivou. Ovaj indeks se bazira na četiri dimenzije: liderstvo, koje ima ponder od 15%, politika (ponder 35%), investicije u čiste tehnologije (ponder 35%) i održivi turizam (ponder 15%). Time su ovim indeksom definisani prioriteti za sprovođenje debate na globalnom nivou o ostvarivanju ciljeva zelene ekonomije u smislu veće zastupljenosti obnovljivih izvora energije, ulaganja u čiste tehnologije i većeg učešća nacionalnih privreda u međunarodnim inicijativama koji podržavaju zelenu tranziciju. Neophodno je da se, pored indikatora koji prate promene u životnoj sredini (kao što su praćenje prosečne temperature, emisija staklene bašte, degradacije zemljišta), posmatraju i prate indikatori van životne sredine koji će omogućiti zajednicama, regionima i čitavim državama da postanu socijalno i ekološki održiva društva. S tim u vezi, Barry i Hoyne (2021) predlažu da se uz ekološke indikatore pažljivo analiziraju i ekonomski indikatori (kao što su eko-inovacije i finansiranje razvojnih projekata) i socijalno-kulturni indikatori (kao što su percepcija rizika i obrazovanje). U narednom delu rada predstavimo metodologiju istraživanja odabranih ključnih indikatora zelene tranzicije na primeru Srbije.

Metodologija istraživanja

Metodologija istraživanja korišćena u ovom radu kombinuje sveobuhvatan pregled literature, prikazan u prethodnom delu rada, uz analizu indeksa zelenog rasta za Republiku Srbiju. Pored navedenog, za analizu energetske tranzicije u Srbiji korišćeni su podaci Elektroprivrede Srbije, Ministarstva energetike i Digitalnog atlasa klime Srbije, dok su u slučaju analize emitovanih zelenih finansijskih instrumenata, korišćeni podatci Uprave za javni dug, Ministarstva finansija Republike Srbije.

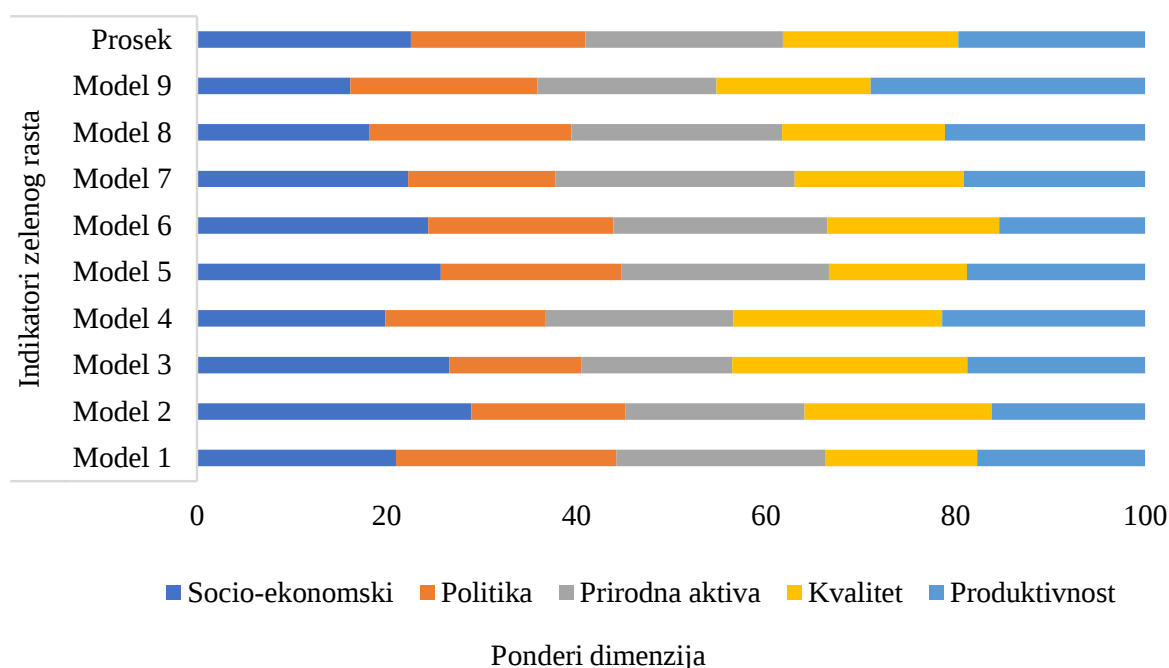
U kreiranju zelenog indeksa koristimo pristup koji su razvili Sarkodie et al. (2023) u cilju izračunavanja vrednosti indeksa zelenog rasta na podacima za Srbiju. Prema pomenutim autorima, zeleni rast obuhvata pet dimenzija:

- (1) Baza prirodnih dobara koja obuhvata podatke o vodnim, zemljišnim, šumskim i životinjskim resursima, kao i podatke o atmosferi i klimi;
- (2) Politika, koja uključuje podatke o patentima, razvojnoj pomoći, međunarodnim finansijskim tokovima, tehnologiji i inovacijama, ekološkim porezima i transferima, kao i propisima i upravljanju;
- (3) Socio-ekonomski, koji obuhvata podatke iz socijalne i ekonomske dimenzije;
- (4) Kvalitet života koji obuhvata podatke o pristupu vodi za piće i izloženosti riziku od uništavanja životne sredine i
- (5) Produktivnost, koja obuhvata podatke o produktivnosti korišćenja ugljen-dioksida, energetske produktivnosti, produktivnosti neenergetskih materijala i ekološkoj produktivnosti.

Ovaj izbor pet dimenzija za kreiranje indeksa zelenog rasta u skladu je sa analizom Organizacije za ekonomsku saradnju i razvoj iz 2014. godine, koja je konstatovala da je za formiranje tih pet dimenzija potrebno 25 do 30 indikatora. Ova analiza ukazuje da predložene dimenzije indikatora nisu konačne i da ovaj predlog daje jasan signal da se radi o fleksibilnom pristupu koji zemlje mogu prilagoditi svojim karakteristikama. Indeks zelenog rasta u analizi Sarkodie et al. (2023) zasniva se na kreiranju sumarnog indeksa primenom metode generalizovanih najmanjih kvadrata, pri čemu se izračunavanje indeksa zasniva na primeni ponderisanja pet dimenzija podataka – Grafikon 1. Pored navedenog pristupa, prema Institutu za globalni zeleni rast, indeks zelenog rasta može se izračunati korišćenjem podataka iz četiri dimenzije iz kojih se može generisati 36 indikatora: (1) efikasno i održivo korišćenje resursa; (2) zaštita prirodnog kapitala; (3) zelene ekonomske mogućnosti i (4) socijalna uključenost.

Na osnovu Grafikona 1, može se videti da je moguće izračunati deset modela indeksa zelenog rasta koji se međusobno razlikuju na osnovu korišćenih pondera. Modeli se međusobno razlikuju po tome koja od pet dimenzija podataka se koristi za izračunavanje, odnosno promena predznaka znači da se dimenzija podataka kreće u suprotnom smeru. Unutar modela 1, suprotan predznak se koristi za bazu prirodnih dobara, ekološku produktivnost i kvalitet životne sredine, za model 2 se ne koristi suprotan znak, za model 3 suprotan znak se koristi za ekološku produktivnost, za model 4 suprotan znak se koristi za kvalitet životne sredine, za model 5 za bazu prirodnih dobara, za model 6 za ekološku produktivnost i kvalitet, za model 7 za ekološku produktivnost i bazu prirodnih dobara, za model 8 za kvalitet životne sredine i bazu prirodnih dobara, za model 9 za odgovor politike, socio-ekonomiju, kvalitet životne sredine, bazu prirodnih dobara i ekološku produktivnost. Model 10 označava prosek pondera korišćenih u proračunu modela 1-9.

Grafikon 1 - Ponderi koji se koriste za konstruisanje indikatora zelenog rasta



Izvor: Sarkodie et al. (2023)

Prilikom izračunavanja indeksa zelenog rasta, prvi korak je izvor varijabli, da bi se zatim izvršila njihova klasifikacija, tretman nedostajućih podataka, podešavanje predznaka za svaku varijablu (gde je to moguće), postavljanje pondera za svaku dimenziju podataka i izračunavanje indeksa.

Za podatke koji nedostaju se dodeljuje fiksna vrednost nula. Ovo dodeljuje niži ponder dimenzijama podataka kojima nedostaju vrednosti. Indeks zelenog rasta izračunava se na osnovu sledeće formule:

$$\hat{s}_{i,j} = \frac{1}{W_{i,j}} \sum_{k \in K_{i,j}} w_{j,k} \frac{y_{i,j,k} - \hat{y}_{j,k}}{\sigma_{j,k}} \quad (1)$$

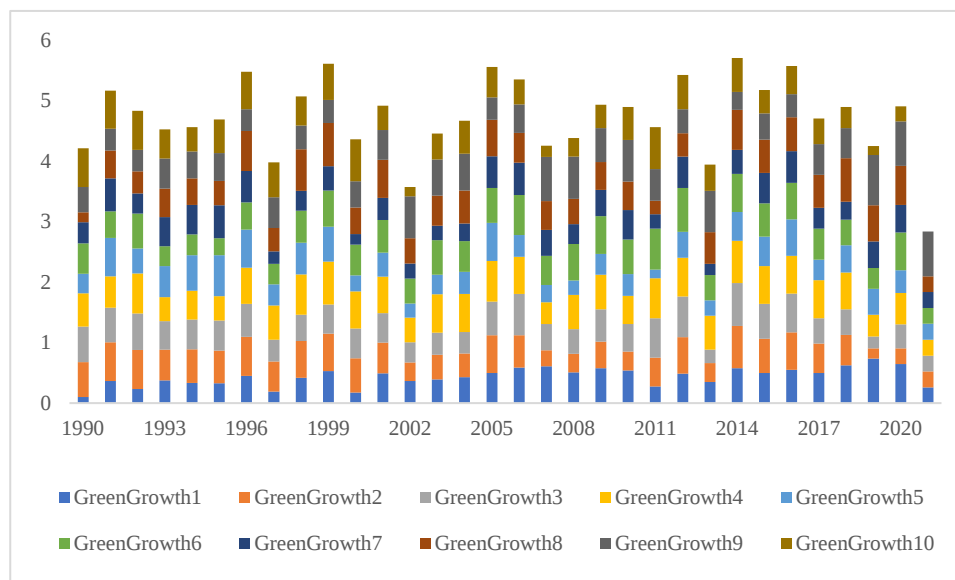
U pomenutoj formuli, $\hat{s}_{i,j}$ predstavlja konstruisani zeleni indeks rasta, dok $w_{i,j}$ i $w_{j,k}$ predstavljaju primenjene pondere, a $(y_{i,j,k} - \hat{y}_{j,k})/\sigma_{j,k}$ predstavlja normalizovani rezultat zasnovan na inverznoj matrici kovarijanse koja je predstavljena sa $\sum_j y_{i,j,k}$. Indeks zelenog rasta podrazumeva kombinovanje više varijabli u kategorije, a zatim nekoliko kategorija u dimenzije i na kraju konstrukciju indikatora zelenog rasta. U narednom delu rada predstavimo rezultate odabranih ključnih indikatora zelene tranzicije na primeru Srbije.

Indeks zelenog rasta

Da bi se rezultati dobijeni o indeksu zelenog rasta analizirali na podacima za Srbiju, potrebno je definisati šta zapravo predstavlja zeleni rast. Sam koncept zelenog rasta je relativno nov koncept sa nizom različitih definicija i bez dobro uspostavljenih metrika za njegovo praćenje. Prema Lyytimäki et al. (2017) zeleni rast je definisan kao proces tranzicije ka postizanju niskougljeničnog društva i društva u kojem će se resursi koristiti na najefikasniji način uz istovremeno postizanje ekonomskog razvoja koji će osigurati ljudsko blagostanje, socijalnu pravdu i očuvanje životne sredine. Sprovođenje ove tranzicije omogućiće dalje povećanje društvenog bogatstva i blagostanja, uz očuvanje vrednosti proizvoda, materijala i resursa u cilju racionalnog korišćenja postojećih resursa. Dakle, cilj politika zelenog rasta je da istovremeno ublaže posledice klimatskih promena uz postizanje održivog ekonomskog rasta (Herman et al., 2023).

Na osnovu prethodno analizirane metodologije za kreiranje indeksa zelenog rasta, prikazani su podaci od 1990. do 2021. godine (poslednji dostupni podaci) za izračunavanje svih deset modela indeksa zelenog rasta na osnovu podataka za Srbiju – Grafikon 2. Kada je u pitanju tumačenje postignute vrednosti modela indeksa zelenog rasta, vrednost 0 se odnosi na niske zelene performanse, dok se vrednost 1 odnosi na visoke zelene performanse. Najveća vrednost indeksa zelenog rasta Srbije u celom analiziranom periodu za sve modele ostvarena je u okviru modela 9 u 2019. godini, kada je vrednost indeksa iznosila 0,83. Te godine, u okviru modela 9, najveći doprinos je dala dimenzija produktivnosti, u kojoj je najveći doprinos dala produktivnost neenergetskih materijala. Kada je reč o najnižoj postignutoj vrednosti, indeks zelenog rasta je 1990. godine u modelu 1 dostigao 0,10. Najoptimalniji model indeksa zelenog rasta je broj dva, u okviru kojeg se ponder od 28,95% odnosi na socio-ekonomsku dimenziju, ponder od 19,74% se odnosi na kvalitet, ponder od 18,87% se odnosi na bazu prirodnih dobara, ponder od 16,25% se odnosi na odgovor politike, a ponder od 16,18% na produktivnost. Na osnovu prikazanih podataka o kretanju indeksa zelenog rasta, može se zaključiti da Republika Srbija ima prosečan nivo zelenog razvoja, imajući u vidu da je prosečna vrednost svih modela u celom analiziranom periodu 0,47. Dobijeni rezultati ukazuju da je neophodno da Republika Srbija nastavi sa promocijom zelenih transformacija kako bi se u narednom periodu ostvario visok nivo zelene tranzicije.

Grafikon 2 - Indeksi zelenog rasta za Srbiju



Izvor: prikaz autora prema

https://figshare.com/articles/dataset/Comprehensive_green_growth_indicators_across_countries_and_territories/22291069

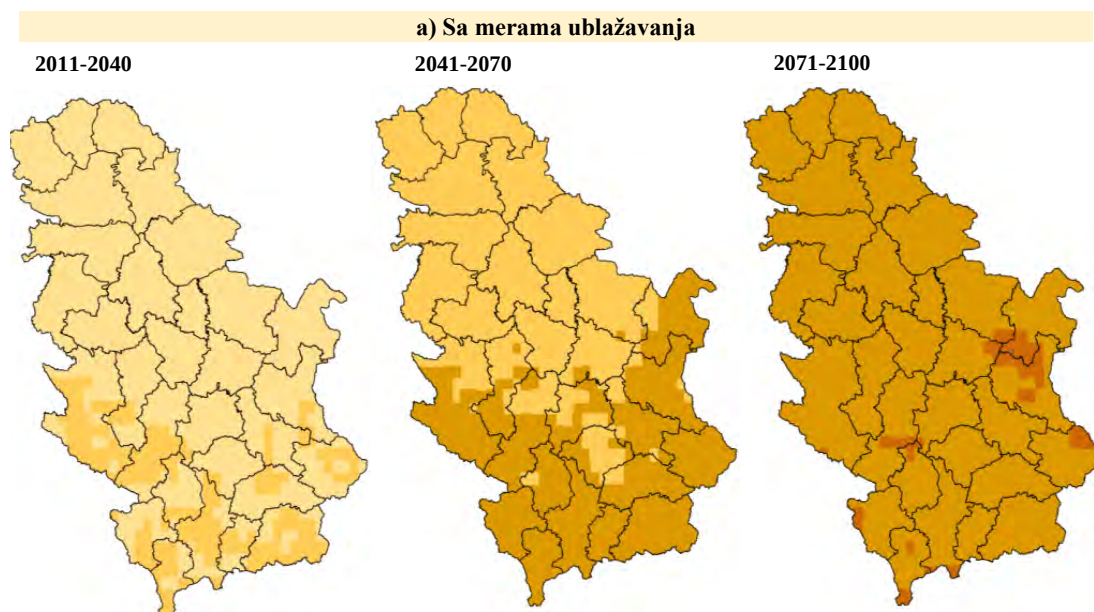
Tranzicija ka zelenoj energiji

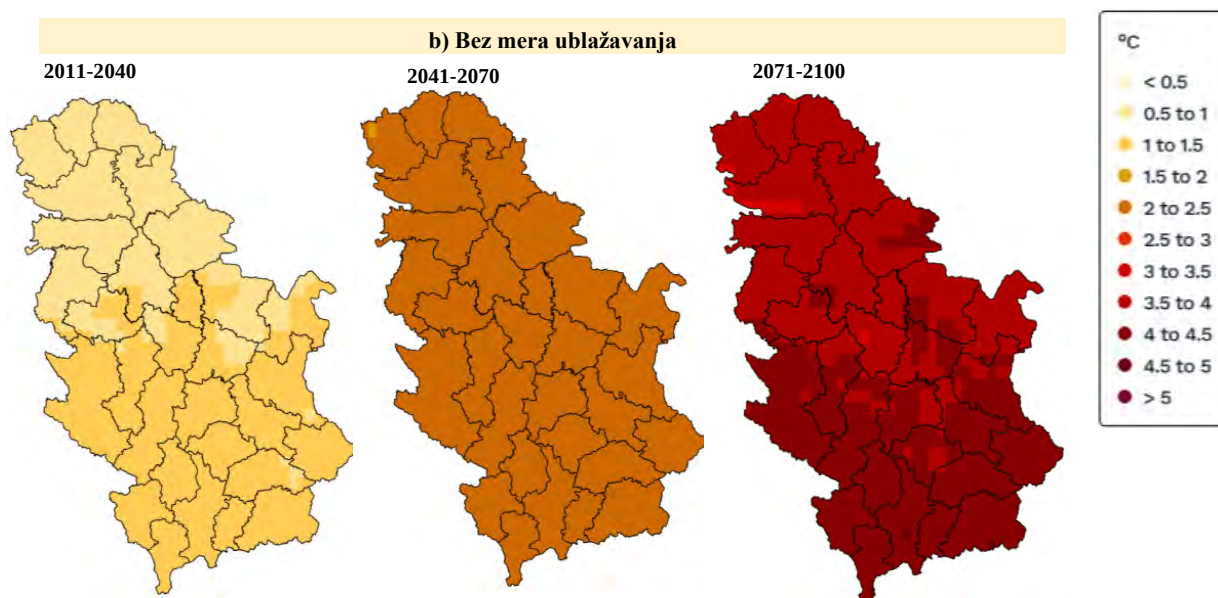
Energetska tranzicija predstavlja jedan od najvećih izazova današnjice, imajući u vidu da njena implementacija predstavlja promenu u snabdevanju i potrošnji energije u nacionalnom energetsom sistemu. Dakle, energetska tranzicija predstavlja prelazak na održive izvore energije u cilju ublažavanja negativnog uticaja klimatskih promena. Cilj energetske tranzicije je smanjenje emisije gasova staklene bašte kako bi se smanjio udeo proizvodnje električne energije iz fosilnih goriva.

U cilju sprovođenja politike klimatske neutralnosti i dekarbonizacije do 2050. godine, kao i ostvarivanja puta ka energetskej tranziciji, Republika Srbija je ratifikovala i potpisala niz međunarodnih akata. Srbija je ratifikacijom Pariskog sporazuma u okviru Ujedinjenih nacija o klimatskim promenama iz 2015. godine preuzela obavezu smanjenja emisije gasova staklene bašte i prihvatila potrebu sprovođenja mera i aktivnosti koje vode ka prilagođavanju na promenjene klimatske uslove, dok je potpisivanjem Ugovora o klimatskim promenama Energetske zajednice i Sofijske deklaracije o Zelenoj agendi za Zapadni Balkan, preuzela obaveze izrade Integrisanog nacionalnog i klimatskog plana. U programu prilagođavanja na izmenjene klimatske uslove za period od 2023. do 2030. godine, Ministarstvo zaštite životne sredine Republike Srbije ističe da se zemlja zagreva brže i više od svetskog proseka. Na globalnom nivou porast srednje temperature iznosi 1,1°C, dok je u Srbiji 1,8°C, a leti je čak i iznad tog nivoa (2,6°C). Pored toga, Srbija je u periodu od 2000. do 2020. godine zabeležila gubitke od čak 6,8 milijardi evra kao rezultat značajnih promena vremenskih uslova i ekstremnih klimatskih uslova.

Od navedenog iznosa, više od 70% se odnosi na štete izazvane visokim temperaturama i sušom, dok su drugi glavni uzrok poplave koje su bile posebno razorne u 2014. godini. Prema podacima Republičkog hidrometeorološkog zavoda Srbije, leto 2024. godine je bilo najtoplije za period meteoroloških merenja od 1951. do 2024. godine, dok su sva tri letnja meseca - jun, jul i avgust - takođe bila najtoplija od 1951. godine. Tople zime u poslednjih nekoliko godina idu u prilog manjoj potrošnji električne energije, ali ekstremno topla leta dovode do veće potrošnje električne energije tokom letnje sezone, a dodatno utiču na manju proizvodnju iz hidroloških izvora usled malih padavina. Ukoliko se ne preduzmu značajne promene u energetsom sistemu Srbije i pređe na obnovljive izvore energije, Republika Srbija bi u narednom periodu mogla da zabeleži značajan porast potrošnje električne energije. Na osnovu interaktivne mape, koju je izradio Digitalni atlas klime Srbije, može se videti da se od Republike Srbije očekuje porast temperature u narednom periodu, posebno ukoliko ne sprovede mere za ublažavanje posledica klimatskih promena, uključujući i prelazak na obnovljive izvore energije. Na Grafikonu 3 prikazane su projekcije srednje dnevne temperature za celu teritoriju Republike Srbije za tri projekciona perioda: 2011-2040, 2041-2070 i 2071-2100. Za prikaz projekcija srednje dnevne temperature u slučaju primene mera za ublažavanje klimatskih promena korišćen je scenario Reprezentativnih puteva koncentracije (eng. Representative Concentration Pathways - RCP) 4.5, koji se zasniva na projekciji da će se emisija gasova staklene bašte stabilizovati na 4,5 W/m² do 2100. U slučaju projekcija ukoliko se ne sprovedu mere za ublažavanje klimatskih promena, korišćen je scenario RCP 8.5, koji podrazumeva da će nivo ugljen-dioksida porasti na 936 delova na milion do 2100. godine, što bi povećalo globalnu temperaturu za oko 5-6°C do 2100. Ovaj vizuelni prikaz projektovane prosečne dnevne temperature može najbolje da ilustruje važnost implementacije tranzicije energije.

Grafikon 3 - Buduća klimatska projekcija srednje dnevne temperature za Srbiju - referentni period 1971-2000





Izvor: prikaz autora prema <https://atlas-klime.eko.gov.rs/eng/map?dataType=obs&visualization=pro&area=regions>

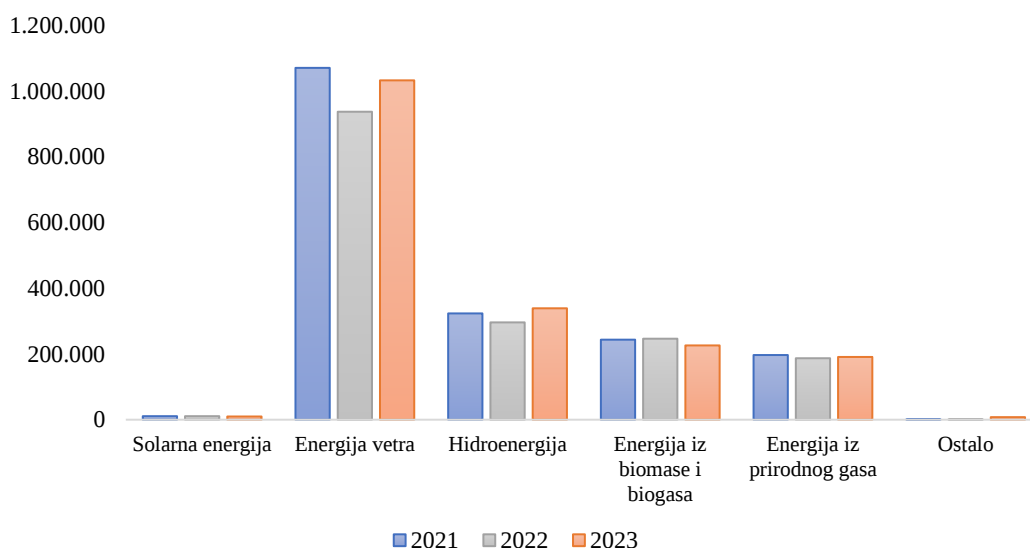
Značajno povećanje letnjih temperatura dovodi do značajne potrošnje električne energije, koja se u Republici Srbiji najvećim delom proizvodi u termoelektranama (oko 70%), dok se 30% dobija iz 16 hidroelektrana. U termoelektranama se najviše koristi ugalj iz površinskih kopova, najviše lignit. Prikazani podaci ukazuju da se većina električne energije u Srbiji proizvodi iz fosilnih goriva.

Prema projekcijama Strategije razvoja energetike Republike Srbije do 2025. godine sa projekcijama do 2030. godine, koja je usvojena početkom decembra 2015. godine, ukupan potencijal obnovljivih izvora energije u našoj zemlji iznosi 5,65 miliona tona naftnih ekvivalenata po godini. Radi regulisanja pitanja vezanih za obnovljive izvore energije, njihovo učešće u bruto finalnoj potrošnji energije, kao i integraciju energije iz obnovljivih izvora za tržište, Republika Srbija je u aprilu 2021. godine donela Zakon o korišćenju obnovljivih izvora energije. Nakon dve godine, u aprilu 2023. godine, usvojen je Zakon o izmenama i dopunama Zakona o korišćenju obnovljivih izvora energije, koji je stupio na snagu početkom maja 2023. godine. Ovim izmenama i dopunama Zakona utvrđena je integracija obnovljivih izvora energije u elektroenergetski sistem sa nastojanjem da se obezbedi bezbedan rad sistema.

Najveći proizvođač električne energije u Srbiji je Elektroprivreda Srbija, čiji je cilj postepeno povećanje kapaciteta iz obnovljivih izvora energije uz istovremeno postizanje karbonske neutralnosti i sprovođenje mera zaštite životne sredine. Prema podacima Elektroprivrede Srbije, u 2023. godini iz obnovljivih izvora energije proizvedeno je 1.806.631,76 MWh električne energije.

U obnovljivim izvorima energije najveće učešće ima energija vetra sa učešćem od 57,2% u 2023. godini, zatim hidroenergija (18,8%) i energija iz biomase i biogasa (12,5%) – Grafikon 4. U narednom periodu cilj Elektroprivrede Srbije ostaje da nastavi da ulaže u životnu sredinu, kao i da sprovodi razvojne planove koji se odnose na povećanje udela obnovljivih izvora energije. Do 2030. godine cilj je da Elektroprivreda Srbije investira oko 3,5 milijardi evra u nove obnovljive izvore, pre svega u hidroenergiju i solarnu energiju, što će u tom periodu predstavljati oko 37 odsto ukupnih investicija kompanije. Ukoliko se uključe ulaganja u nove hidroelektrane, ukupna ulaganja u obnovljive izvore energije Elektroprivrede Srbije do 2030. godine iznosiće oko 5,4 milijarde evra, odnosno više od polovine ukupnih investicija.

Grafikon 4 - Proizvodnja električne energije iz obnovljivih izvora u Srbiji (u MWh)



Izvor: prikaz autora prema <https://www.eps.rs/cir/Pages/tehnicki-izvestaji.aspx>

Veliki doprinos povećanju udela obnovljivih izvora energije dalo je Ministarstvo rudarstva i energetike, koje je do sada raspisalo dve aukcije za dobijanje ponuda za obnovljive izvore energije. Cilj je da se kroz sistem podsticaja obezbedi 1.300 MW iz zelene energije za period od tri godine (2023-2025). Prva aukcija održana je sredinom avgusta 2023. godine, na kojoj se prijavilo 16 investitora za ukupnu elektranu od 816,48 MW, od čega je za popunjavanje kvote ponuđeno 602,8 MW, dok je procenjena vrednost ulaganja svih elektrana 1,26 milijardi evra. Od ukupnog broja registrovanih investitora, 11 učesnika se kvalifikovalo za fazu nadmetanja. U postupku aukcije za vetroelektrane kvotu su popunila četiri investitora, dok su na aukciji za solarne elektrane kvotu popunila tri. Najniža ponuđena cena bila je 64,48 evra po megavat-satu (EUR/MWh) za vetroelektrane ili 88,65 evra po megavat-satu za solarne elektrane. U februaru 2024. godine Ministarstvo rudarstva i energetike najavilo je da će do kraja 2024. godine organizovati drugi krug aukcija za novi kapacitet od 400 MW iz obnovljivih izvora energije. Krajem novembra 2024. godine Ministarstvo rudarstva i energetike je objavilo drugi krug aukcija za dodelu tržišnih premija za obnovljive izvore energije, na kojima će se investitori nadmetati

za raspodelu kvota od ukupno 424,8 MW (300 megavata predviđeno je za vetroelektrane, a 124,8 MW za solarne elektrane). Rok za podnošenje prijave za učestvovanje na drugoj aukciji ističe 5. februara 2025. godine.

Pored aukcija za dodelu tržišnih premija za obnovljive izvore energije, potpisano je nekoliko važnih ugovora za povećanje učešća obnovljivih izvora energije. Početkom jula 2024. godine potpisani su ugovori i sporazumi kojima je zaokruženo finansiranje za realizaciju novog programa sa Evropskom bankom za obnovu i razvoj u vrednosti od 40,5 miliona evra, kojim se obnovljivi izvori energije uvode u 10 toplana u Srbiji. Evropska banka za obnovu i razvoj kreirala je program Green Economy Financing Facility (GEFF) koji podržava zelene investicije u Srbiji i sprovodi se u okviru Regionalnog programa energetske efikasnosti za Zapadni Balkan (eng. Regional Energy Efficiency Program for the Western Balkans - REEP Plus). Sredinom oktobra 2024. godine potpisan je ugovor za realizaciju projekta izgradnje samobalansiranih solarnih elektrana u Srbiji, koje će obezbediti 1 GW novoinstalisane snage preko solarnih panela. Očekuje se da će prvi kapaciteti biti uključeni već 2027. godine, a ceo projekat, odnosno najveće solarne elektrane, biće završen sredinom 2028. godine. Važno je istaći podršku građanima da zamene dotrajalu stolariju, fasade, izolacije, neefikasne kotlove, ali i da ugrade solarne kolektore i panele za proizvodnju električne energije za sopstvene potrebe. U uslovima energetske krize, veća energetska efikasnost u domaćinstvima postaje sve važnija tema, kako za kućne budžete, tako i za zaštitu životne sredine. Za subvencije koje u zavisnosti od paketa mera mogu da idu i do 65 odsto vrednosti investicije. Primena mera energetske efikasnosti donosi mnoge prednosti, kao što su ušteda novca, povećanje udobnosti življenja i povećanje vrednosti imovine u kojoj živite.

Zeleni finansijski instrumenti

Kretanje važnih makroekonomskih indikatora je nesumnjivo pod uticajem globalnog zagrevanja i njegovih efekata na klimatske promene, što primorava kreatore ekonomske politike da sprovedu proces zelene transformacije. Da bi se to postiglo, moraju se razviti zeleni finansijski instrumenti koji uzimaju u obzir društvene faktore i faktore životne sredine prilikom donošenja investicionih odluka. Ovo će podstaći više ulaganja u ekološki održivo poslovanje. Zelene finansije igraju značajnu ulogu u finansiranju inicijativa koje imaju za cilj unapređenje opšteg blagostanja privrede i društva, kao i postizanje globalnih ciljeva zacrtanih u strateškim programima kao što su Evropski zeleni dogovor i Agenda za održivi razvoj do 2030. godine, od kojih oba imaju kao primarni cilj smanjenje emisije gasova staklene bašte. Stoga, postizanje ciljeva zelene ekonomije predstavlja izazov i šansu za finansijski sektor da stvori održivo finansiranje. Održivo finansiranje se može posmatrati kroz široki spektar aktivnosti: od digitalizacije aktivnosti banaka, smanjenja nivoa ugljenika u njihovim svakodnevnim aktivnostima, do ponude održivih finansijskih proizvoda (Sredojević and Sredojević, 2021). Značajnu ulogu u razvoju zelenih finansijskih instrumenata pored poslovnih banaka imaju i centralne banke koje su u poslednjih nekoliko godina izložene novim izazovima i zadacima sa kojima je potrebno da se suoče. Jedan od tih izazova predstavljaju klimatske promene, koje direktno utiču na glavne ciljeve centralne banke, a to je postizanje i održavanje cenovne i finansijske stabilnosti (Martin, 2022).

Emitovanje zelenih finansijskih instrumenata ubrzano raste u poslednjih nekoliko godina, a očekuje se veći rast u bliskoj budućnosti. To se odnosi na finansiranje preduzeća, projekata i drugih poduhvata koji pomažu u postizanju održivog, pravičnog rasta, jer direktno unapređuje ciljeve održivog razvoja. U tom svetlu, trend „ozelenjavanja“ finansija postaje sve značajniji, zahvaljujući rastućem interesovanju javnosti za očuvanje i zaštitu životne sredine, kao i povećanom protoku informacija, uglavnom putem medija. To je trend koji je nastao iz potrebe da se profit preoblikuje kao primarni cilj i umesto toga uokviren kao uspostavljanje ravnoteže između profita i očuvanja životne sredine. Zeleni razvoj je globalni pokret koji guraju najmoćnije međunarodne organizacije i jedan je od glavnih prioriteta.

Bankarski sektor u Srbiji se sve više uključuje u ovu oblast i razume prednosti finansiranja ekološki prihvatljivih inicijativa. Do sada su se krediti najvećim delom odobravali za razvoj vetroelektrana, reciklažu, solarnu energiju, prečišćavanje vode i projekte u energetske sektoru sa ciljem smanjenja emisije CO₂. Sve su popularniji krediti za kupovinu električnih vozila, zeleni poljoprivredni investicioni krediti, krediti za projekte visoke energetske efikasnosti, investicioni krediti u oblasti obnovljivih izvora energije. Banka podstiče pojedince ili privredne subjekte da donose odluke koje su prihvatljive za životnu sredinu postavljanjem uslova kreditiranja, koje uključuju kamatnu stopu, iznos kolateralu i druge prednosti ili komponente kredita. Smanjenjem finansijskih zahteva i ograničenja, posebno za projekte koji ne štete životnoj sredini, utvrđeni su prioriteti finansiranja.

Postizanje održivog privrednog rasta i unapređenje održivog finansiranja na globalnom finansijskom tržištu su prioriteti za Republiku Srbiju. Zajedno sa kontinuiranim rastom tradicionalnih finansijskih instrumenata, napreduju i održivi finansijski instrumenti (Martin, 2023). Republika Srbija je do danas izdala dva održiva finansijska instrumenta: zelenu obveznicu u septembru 2021. i održivu obveznicu u junu 2024. godine. Republika Srbija je prvi put u svojoj istoriji emitovala zelenu evroobveznicu od 1,0 milijardi evra sredinom septembra 2021. godine. Obveznica ima rok dospeća od sedam godina, stopu prinosa od 1,26% i najnižu stopu kupona ikada zabeleženu - 1,00%. Republika Srbija je postala jedna od retkih zemalja u Evropi - i jedina koja nije deo Evropske unije - kada je prvi put izdala zeleni instrument. Prilikom izdavanja zelenih obveznica poštovani su principi zelenih obveznica Međunarodnog udruženja tržišta kapitala, a objavljivanje Okvira zelenih obveznica Republike Srbije u septembru 2021. godine regulisalo je korišćenje prikupljenih sredstava. U junu 2022. godine, Republika Srbija je dobila nagradu „Pionir suverenog zelenog tržišta u 2021“ od Climate Bond Initiative, demonstrirajući ekološku svest naše zemlje.

Republika Srbija je početkom juna 2024. godine uspešno emitovala održive dolarske evroobveznice na svetskom finansijskom tržištu. Prihod od prodaje obveznica biće namenjen finansiranju ekološki osvešćenih projekata i društveno svesnih poduhvata. Ukupna vrednost prodatih hartija od vrednosti bila je 1,5 milijardi dolara, ali je tokom dana potražnja investitora bila daleko veća i premašila je 6,5 milijardi dolara. Kao i kod drugih emisija evroobveznica u dolarima, Republika Srbija je takođe zaključila ugovore o hedžingu kako bi smanjila kamatnu stopu javnog duga i devizni rizik i pokazala odgovornost za njegovu održivost. Kroz ove transakcije, primenjen je unakrsni međuvalutni svop po osnovu kojeg je došlo do zamene obaveze po osnovu izdavanja dolarskih evroobveznica u obaveze u evrima. Republika Srbija je ovu hedžing transakciju zaključila sa Deutsche Bank AG, Bank of America, BNP Paribas i MUFG Securities (Europe) N.V. Ovo je smanjilo stvarni trošak zaduživanja Republike Srbije na 4,75%, uz smanjenje izloženosti deviznom riziku kretanja dolara u odnosu na evro. U izdavanju obe ponude zelenih obveznica praćeni su Okvir održivog finansiranja Republike Srbije i Drugo partijsko mišljenje (eng. Second Party Opinion - SPO) o okviru održivog finansiranja, koje je izradila Uprava za javni dug, Ministarstvo finansija. Ovi dokumenti pokazuju posvećenost Republike Srbije postizanju ciljeva agende održivog razvoja u cilju stvaranja održive budućnosti za generacije koje dolaze. Ovo daje utemeljenje za sprovođenje nacionalne dekarbonizacije i očuvanje životne sredine.

Zaključak

Cilj zelene tranzicije je razvoj i implementacija zelenih i održivih rešenja u cilju očuvanja životne sredine. Danas su klimatske promene globalna pretnja koja zahteva hitnu akciju kako bi se otklonile posledice ovih promena. Ovo daje mogućnost, u zavisnosti od primenjenih mera, da se stvori resursno

efikasna, moderna i konkurentna ekonomija zasnovana na primeni zelene tehnologije i održivih poslovnih rešenja. Pretvaranje klimatskih i ekoloških izazova u prilike učiniće tranziciju pravednom i inkluzivnom za sve. Srbija, kao kandidat za članstvo u Uniji, ide u korak sa zahtevima, donoseći planove, mere i aktivnosti u oblasti zelene tranzicije.

U cilju praćenja napretka i uspeha u sprovođenju mera zelene tranzicije, potrebno je odabrati i pomno pratiti ključne indikatore zelene tranzicije, pri čemu njihov izbor treba prilagoditi karakteristikama privrede svake konkretne zemlje. Cilj ovog rada je da predstavi ključne indikatore zelene tranzicije na primeru Srbije, gde smo predstavili tri: indeks zelenog rasta, tranziciju ka većem korišćenju zelene energije i instrumente zelenog finansiranja. Formiranje indeksa zelenog rasta zasniva se na metodologijiku su razvili Sarkodie et al. (2023), a koja se bazira na kreditiranju zbirnog indeksa metodom generalizovanih najmanjih kvadrata, gde se izračunavanje indeksa zasniva na primeni ponderisanja pet dimenzija podataka (društveno-ekonomski, politika, prirodna dobra, kvalitet i produktivnost). Analiza je pokazala da je Srbija u analiziranom periodu (1990-2021) imala prosečnu vrednost zelenog indeksa rasta od 0,47 po svim modelima, što ukazuje da zemlja ima prosečan nivo zelene tranzicije. Navedeni rezultat ukazuje na neophodnost da Srbija nastavi da sprovodi zelenu transformaciju kako bi vrednost indeksa bila blizu 1, što predstavlja vrednost visokih zelenih performansi.

U oblasti tranzicije ka većoj upotrebi zelene energije, Srbija je ratifikovala i potpisala veliki broj međunarodnih sporazuma (kao što su Pariski sporazum, Sofijska deklaracija o Zelenoj agendi za Zapadni Balkan i Ugovor o energetske zajednici) sa ciljem postizanja klimatske neutralnosti i dekarbonizacije. Kako leta postaju toplija, a proizvodnja električne energije iz hidroenergije opada zbog manje padavina, potrebno je povećati učešće obnovljivih izvora energije kao što su solarna energija i energija vetra. U cilju postizanja navedenog, Republika Srbija je u aprilu 2021. godine usvojila Zakon o korišćenju obnovljivih izvora energije, a nakon dve godine je došlo do izmene tog zakona. Najveći proizvođač električne energije u Srbiji je Elektroprivreda Srbije, koja najveći deo obnovljivih izvora energije proizvodi iz energije vetra, a slede hidroenergija i energija iz biomase i biogasa. Cilj ove kompanije je da do 2030. godine investira oko 3,5 milijardi evra u obnovljive izvore energije. Veliki doprinos zelenoj tranziciji u oblasti energetike daje Ministarstvo rudarstva i energetike, koje ima plan da proizvede 1.300 MW od zelenih izvora energije do 2025. godine. U cilju ostvarivanja ovog ambicioznog cilja, Ministarstvo organizuje aukcije za dobijanje ponuda za obnovljive izvore energije, potpisuje ugovore sa međunarodnim finansijskim organizacijama, poput Evropske banke za obnovu i razvoj, kako bi povećalo učešće obnovljivih izvora energije i daje subvencije domaćinstvima za zamenu dotrajale stolarije, fasade, izolacije, neefikasnih kotlova, ali i za postavljanje solarnih kolektora i panela za proizvodnju električne energije za sopstvene potrebe. Sve navedeno doprinosi jačanju energetskih kapaciteta zemlje, koji se zasnivaju na očuvanju životne sredine.

Da bi se sprovela zelena tranzicija potrebna su značajna ulaganja. S tim u vezi, važno je aktivno raditi na razvoju zelenih finansijskih instrumenata. Republika Srbija je do sada emitovala dva održiva finansijska instrumenta: zelenu obveznicu u septembru 2021. godine i održivu obveznicu u junu 2024. godine. Sredinom septembra 2021. godine, prvi put na međunarodnom finansijskom tržištu, emitovala je zelenu evroobveznicu od jedne milijardi evra sa rokom dospeća od sedam godina. Ova zelena obveznica je imala stopu prinosa od 1,26% i kuponsku stopu od 1,00%. Početkom juna 2024. godine, Republika Srbija je na međunarodnom finansijskom tržištu emitovala održivu evroobveznicu od 1,5 milijardi dolara sa rokom dospeća od deset godina i kuponskom stopom od 6,00%. Sredstva prikupljena od ove emisije biće uložena u nekoliko programa definisanih zelenom agendom, kao i u društveno odgovorne poduhvate.

Analiza je pokazala da je Republika Srbija, na osnovu prikazanih rezultata tri indikatora zelene tranzicije, postigla značajne rezultate u oblasti zelene transformacije, uz neophodnost da nastavi rad usmeren

na izgradnji energetske efikasne privrede koja zasniva svoju konkurentnost na principima održivosti. Sve je to u skladu sa strateškim opredeljenjem zemlje u pristupnim pregovorima za članstvo u Evropskoj uniji i ostvarivanjem ciljeva zelene agende za postizanje klimatske neutralnosti na nivou Evropske unije do 2050. godine.

Tema zelene tranzicije je vrlo inspirativna za dalja istraživanja koja bi mogla da se bave dodatnom analizom energetske efikasnosti poput sagledavanja modela energetske efikasnosti, ukazivanja na neophodnost postojanja javne svesti i važnosti obrazovanja u sprovođenju efikasnih strategija energetske efikasnosti, ali i ispitivanje veze između energetske efikasnosti, ekonomskog rasta i zaštite životne sredine. Kada je reč o zelenim finansijskim instrumentima, dalja analiza bi mogla da se sprovede na podacima konkretnih banaka i drugih finansijskih institucija, imajući u vidu sve veću potrebu za odobravanjem kredita za kupovinu električnih vozila, zelenih poljoprivrednih kredita, kredita za projekte implementacije energetske efikasnosti i investicionih kredita u oblasti obnovljivih izvora energije. Navedeno ukazuje da je potrebno da centralne banke i finansijski regulatori ulože zajedničke napore, kako bi svako iz domena svoje nadležnosti podržao razvoj zelenih finansija i uspostavljanje zelene ekonomije.

References

1. Acosta, L., Maharjan, P., Peyriere, H. and Mamiit, R. (2020). Natural capital protection indicators: Measuring performance in achieving the Sustainable Development Goals for green growth transition, *Environmental and Sustainability Indicators*, 8 (2020), pp. 1-21, <https://doi.org/10.1016/j.indic.2020.100069>.
2. Airò Farulla, G., Tumminia, G., Sergi, F., Aloisio, D., Cellura, M., Antonucci, V. and Ferraro, M. (2021). A Review of Key Performance Indicators for Building Flexibility Quantification to Support the Clean Energy Transition, *Energies*, 14 (18), pp. 1-14, <https://doi.org/10.3390/en14185676>.
3. Barry, D. and Hoyne, S. (2021). Sustainable measurement indicators to assess impacts of climate change: Implications for the New Green Deal Era. *Current Opinion in Environmental Science & Health*, 22 (2021), pp. 1-6, <https://doi.org/10.1016/j.coesh.2021.100259>.
4. Cheba, K., Bąk, I., Szopik-Depczynska, K. and Ioppolo, G. (2022). Directions of green transformation of the European Union countries, *Ecological Indicators*, 136 (108601), pp. 1-15, <https://doi.org/10.1016/j.ecolind.2022.108601>.
5. Dahaeva, F. and Amirova, A. (2023). „Sustainable Development Goals and Green Economy Indicators” in *Proceedings of the 1st International Conference on Methods, Models, Technologies for Sustainable Development*, pp.136-140.
6. Digital Climate Atlas of Serbia: <https://atlas-klime.eko.gov.rs/eng/map?dataType=obs&visualization=pro&area=regions>. (accessed 7 October 2024).
7. Electronic resource: https://figshare.com/articles/dataset/Comprehensive_green_growth_indicators_across_countries_and_territories/22291069. (accessed 8 October 2024).
8. Elektroprivreda Srbije: <https://www.eps.rs/cir/Pages/tehnicki-izvestaji.aspx>. (accessed 8 October 2024).
9. European Commission (2009), „Key Performance Indicators for Environmental, Social & Governance”, available at: <https://ec.europa.eu/docsroom/documents/1547/attachments/1/translations/en/renditions/pdf> (accessed 14 October 2024).
10. Franco, A., Miserocchi, L. and Testi, D. (2023). Energy Indicators for Enabling Energy Transition in Industry. *Energies*, 16 (581), pp. 1-18, <https://doi.org/10.3390/en16020581>.
11. Global Green Growth Institute, Green Growth Index: <https://greengrowthindex.gggi.org/wp-content/uploads/201/#introduction>. (accessed 16 October 2024).

12. Herman, K., Jae Kim, Y., Shayegh, S. and Xiang, J. (2023). A critical review of green growth indicators in G7 economies from 1990 to 2019, *Sustainability Science*, 18 (2023), pp. 2589–2604, <https://doi.org/10.1007/s11625-023-01397-y>.
13. Lyytimäki, J., Antikainen, R., Hokkanen, J., Koskela, S., Kurppa, S., Känkänen, R. and Seppälä, J. (2017). Developing Key Indicators of Green Growth, *Sustainable Development*, 13 (2017), pp. 1-14, <https://doi.org/10.1002/sd.1690>.
14. Martin, V. (2022). Climate change and the role of central banks, *Bankarstvo*, 51 (2), pp. 86-116, doi: 10.5937/bankarstvo2202086M.
15. Martin, V. (2023). Green Finance: Regulation and Instruments. *Journal of Central Banking Theory and Practice*, 12 (2), pp. 185-209, <https://doi.org/10.2478/jcbtp-2023-0019>.
16. Ministry of Environmental Protection of the Republic of Serbia: <https://www.ekologija.gov.rs/sites/default/files/2024-01/program-prilagodjavanja-na-izmenjene-klimatske-uslove-za-period-od-2023-do-2030-godine.pdf>. (accessed 18 October 2024).
17. OECD, ESG Investing: Environmental Pillar Scoring and Reporting: https://www.oecd-ilibrary.org/finance-and-investment/esg-investing_80680dc8-en. (accessed 27 November 2024).
18. OECD, ESG ratings and climate transition: https://www.oecd.org/en/publications/esg-ratings-and-climate-transition_2fa21143-en.html. (accessed 27 November 2024).
19. OECD, Global Corporate Sustainability Report 2024: https://www.oecd.org/en/publications/global-corporate-sustainability-report-2024_8416b635-en.html. (accessed 27 November 2024).
20. OECD, Green Growth Indicators 2014: https://www.oecd.org/en/publications/green-growth-indicators-2013_9789264202030-en.html. (accessed 16 October 2024).
21. Petrović Tomić, N. (2023). Sustainable business – are ESG standards powering the resilience of a new business model?, *Bankarstvo*, 52 (2-3), pp. 202-221, doi: 10.5937/bankarstvo2303202P.
22. Republic Hydrometeorological Service of Serbia: <https://www.hidmet.gov.rs/data/klimatologija/latin/leto.pdf>. (accessed 18 October 2024).
23. Rotondo, F., Perchinunno, P., L'Abbate, S. and Mongelli, L. (2022). Ecological transition and sustainable development: integrated statistical indicators to support public policies. *Scientific Reports*, 12 (18513), pp. 1-12, <https://doi.org/10.1038/s41598-022-23085-0>.
24. Ryszawska, B. (2014). „Towards a green economy“ in *From ideas to practice Chapter: Green Economy Indicators*, Wydawnictwo Uniwersytetu Łódzkiego, Łódź, Poland, pp. 31-52.
25. Sarkodie, S. Asantewaa Owusu, P. and Taden, J. (2023). Comprehensive green growth indicators across countries and territories, *Scientific Data*, 10 (413), pp. 1-19, <https://doi.org/10.1038/s41597-023-02319-4>.
26. Sredojević, S. and Sredojević, D. (2021). Sustainable finance – evolution or revolution in the banking sector, *Bankarstvo*, 50 (2), pp. 114-151, doi: 10.5937/bankarstvo2102114S.
27. Timonen, K., Reinikainen, A., Kurppa, S. and Riipi, I. (2021). Key Indicators and Social Acceptance for Bioenergy Production Potential as Part of the Green Economy Transition Process in Local Areas of Lapland. *International Journal of Environmental Research and Public Health*, 18 (527), pp. 1-20, <https://doi.org/10.3390/ijerph18020527>.
28. UN, Global Sustainable Development Report 2023: https://sdgs.un.org/gedr/gedr2023?utm_source=chatgpt.com. (accessed 28 November 2024).
29. UN, Sustainable Development Goals (SDGs) Report 2023: https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf. (accessed 28 November 2024).
30. Vukovic, N., Pobedinsky, V., Mityagin, S., Drozhzhin, A. and Mingaleva, Z. (2019). A Study on Green Economy Indicators and Modeling: Russian Context, *Sustainability*, 11 (2019), pp. 1-13, doi:10.3390/su11174629.

Received: 06.11.2024. god.
Accepted: 29.11.2024. god.

DOI: 10.5937/bankarstvo2403194M

KEY PERFORMANCE INDICATORS IN GREEN TRANSITION: THE CASE OF SERBIA

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„The green transition poses a uniquely difficult policy challenge, because the stakes of failure are so high and yet the path to success is so complex“

Christine Lagarde, President of the European Central Bank

Speech “Towards an Orderly Energy Transition”, Paris, 29 September 2023

Summary: Serbia, like nearly every other nation in the world, is putting into practice a green transition strategy to create a low-carbon economy founded on sustainability objectives. As a result, a system is established that will grow and develop based on protecting the environment while honoring the social and economic facets of business. This paper aims to assess the major performance indicators in the green transition using Serbia as an example. Specifically, we will look at the green growth index, the shift to using more green energy, and the issuance of green financial instruments. These three metrics were selected to demonstrate Serbia's advancement toward sustainable development and the green transition, both of which are critical to the deployment of adaption strategies and the mitigation of climate change's effects. In terms of methodology, the analysis by Sarkodie et al. (2023) served us to create a green index based on data for Serbia. The Ministry of Finance's Public Debt Administration provided data for emissions of green instruments, while the Electric Power Company of Serbia provided data for the analysis of the energy transition. According to the analysis, Serbia has made significant progress in terms of the green transition indicators examined.

Keywords: green transition, key performance, green growth index, green energy transition, green finance instruments.

JEL classification: O44, Q01, Q54, Q58

**The views expressed in this paper are those of the author and do not necessarily represent the official view of the Economists Association of Belgrade.*

Introduction

The Republic of Serbia, like the majority of other nations, is putting sustainable business strategies and technologies into place to foster economic growth while minimizing negative environmental effects. Key performance indicators, such as the percentage of renewable energy sources in total electricity production, greenhouse gas emissions, waste management, biodiversity indicators, investments in green technology, and the creation of green jobs, are necessary to track progress in the green transition. In order to monitor the green transition, each nation must select a sufficient set of key performance indicators that are tailored to the nation's unique economic structure, environmental concerns, and electrical generation sources. Using Serbia as an example, we will analyze key performance indicators in the green transition in this paper. Specifically, we will look at the green growth index, green energy transition, and green financing instruments. Keeping an eye on these metrics will provide you a thorough understanding of Serbia's approach to sustainable development, the outcomes attained thus far, and the areas that require further attention.

This paper's primary research questions (RQs) are:

RQ 1: What is the Republic of Serbia's optimal green growth index?

RQ 2: What initiatives has the Republic of Serbia undertaken to increase the share of renewable source of energy?

RQ 3: Which green financial instruments, and under what circumstances, has the Republic of Serbia issued up to this point?

This paper is structured as follows: A review of the relevant literature follows the introduction. The research methodology analysis and presentation of the data sources utilized for the analysis of the green energy transition and issued green finance instruments, as well as the formation of the Republic of Serbia's green growth index, are the primary topics of the second part of the paper. In the concluding remarks, we will summarize the primary findings of the paper.

Literature Review

Green transformation has become one of the main directions of future development at the global level and includes the development of green technology and the implementation of regulations that will enable the application of environmentally friendly solutions. Thus, green transformation implies economic growth that combines environmental protection with the preservation of living standards for current and future generations, as well as the rational use of available natural resources (Cheba et al., 2022 and Acosta et al., 2020). The goal of achieving a green economy is to protect the environment and preserve the interests of all members of society. The important elements of that transformation include ecological certification, ecological audit and other activities (Vukovic et al., 2019). In order to measure progress in achieving the green transition, it is necessary to have key performance indicators that will serve to measure progress in achieving the goals of sustainable growth and development. When choosing key performance indicators that each country will monitor, it is necessary to take into account the characteristics of the economy itself in order to develop an adequate methodology for their monitoring, then it is necessary to choose those indicators that have a high degree of granularity, which is especially important when it comes to reporting on results and finally it is necessary to carry out adequate structuring of the report and develop the necessary reporting standards that will enable automatic monitoring of the selected key performance indicators.

Achieving a green economy is one of the key goals formally adopted at the United Nations Conference on Sustainable Development held in Rio de Janeiro in 2012 (Timonen et al., 2021). The development in the application of the concept of sustainability and the availability of new data require constant checking of a set of indicators that will measure the level of social well-being in the best way (Rotondo et al., 2022). At the global level, the United Nations has announced sustainable development goals for the period 2016-2030 in the 2030 Agenda for Sustainable Development, which include 17 goals and 169 targets for their implementation. This creates indicators on a global level that reflect the ideology of sustainable development and create a balance between social, economic and environmental preservation priorities (Dahaeva and Amirova, 2023).

An important contribution to the analysis of Environmental, Social and Governance (ESG) indicators was made by international organizations such as the Organization for Economic Cooperation and Development and the United Nations. The focus of the analysis in the report "ESG Investing: Environmental Pillar Scoring and Reporting" of the Organization for Economic Co-operation and Development is how to measure the impact within part E (Environmental) of the ESG concept in order to better understand the output effects such as carbon dioxide emissions, but also the negative impact of certain economic activities on the environment. Thus, this analysis can benefit from a better understanding of whether the pillar under Part E (Environmental) can adequately help markets and investors, who use the concept of ESG investments, to increase the resilience of their portfolios to the presence of physical risk and on the implementation of climate transition. In a 2022 report, entitled "ESG ratings and climate transition", the Organization for Economic Co-operation and Development pointed out areas where part E (Environmental) of the ESG concept can be improved in order to meet the goals of the low-carbon transition economy and thereby provided support to international efforts in implementing the green transition. This report particularly points to the importance of effective monitoring of progress in the process of transition to a low-carbon economy by all market participants. In the annual report on global corporate sustainability for 2024, the Organization for Economic Co-operation and Development indicates that the importance of analysis of applied sustainability strategies around the world. The analysis is based on the presentation of the principles of corporate governance, then the disclosure of sustainability data, but also the necessity of effective dialogue between all interested parties such as the board of directors and shareholders.

In the report on the Sustainable Development Goals for 2023, the United Nations presented a comprehensive overview of progress towards achieving the 17 Sustainable Development Goals, which highlighted the successes, but also the challenges that countries face in achieving sustainable development. To gain progress in achieving the goals of sustainable development, the United Nations in the Global Sustainable Development Report for 2023 highlighted key transformations that must be implemented in various sectors through a structured and systemic approach. Those key transformations are related to human well-being, truly sustainable and fair economies, establishing a healthy food system and applying decarbonization in energy production. The aforementioned reports of the United Nations indicate the commitment of this organization to the advancement of ESG principles at the global level, while at the same time establishing a framework to achieve sustainable development.

From the perspective of the analysis of the European Commission (2009), key performance indicators in the field of application of ESG principles can be divided into general ESGs, which refer to areas on which all companies should report (such as energy efficiency) and sector-specific ESGs, which represent the areas reported by companies from a specific industry (for example waste storage related to industries such as gas and chemical production). ESG criteria are a set of standards that banks and other investors consider if they aspire to invest money in ecological and socially beneficial projects (Petrović Tomić, 2023).

Franco et al. (2023) emphasize the importance of monitoring energy indicators in order to monitor the energy transition and indicate that it is necessary to characterize the energy composition of each individual industry in order to create an energy mix that supports the green transition. The authors indicate that energy efficiency depends on the possibility of using renewable energy sources, their availability and speed of implementation. The transition to a sustainable society and carbon neutrality from 2050 requires significant use of renewable energy sources, which significantly affects the stability of the existing energy network (Airò Farulla et al., 2021). In her analysis, Ryszawska (2014) points out the importance of monitoring the global green economy index, which represents a synthetic approach for monitoring the degree of realization of the green economy at the global level. This index consists of four dimensions: leadership, which has a weight of 15%, policy (weight 35%), cleantech investment (weight 35%) and sustainable tourism (weight 15%). Thus, this index defines the priorities for the implementation of the debate at the global level on the achievement of the goals of the green economy in terms of greater representation of renewable energy sources, investments in clean technologies and greater participation of national economies in international initiatives that support the green transition. It is essential that, in addition to indicators that monitor environmental changes (such as monitoring average temperature, greenhouse emissions, soil degradation), indicators outside the environment that will enable communities, regions and entire countries to become socially and ecologically sustainable are observed and monitored. In this regard, Barry and Hoyne (2021) suggest that economic indicators (such as eco-innovations and financing of development projects) and social-cultural indicators (such as risk perception and education) should be carefully analyzed in addition to environmental indicators. In the next part of the paper, we will present the research methodology for selected key performance indicators in green transition on the example of Serbia.

Research Methodology

The research methodology employed in this paper combines a comprehensive literature review, presented in previous section, along with the analysis of the green growth index for the Republic of Serbia. In addition to the above, for the analysis of the energy transition in Serbia, the data of the Electric Power Company of Serbia, the Ministry of Energy and the Digital Climate Atlas of Serbia were used, while in the case of the analysis of issued green financial instruments, we used the data of the Public Debt Administration, Ministry of Finance of the Republic of Serbia.

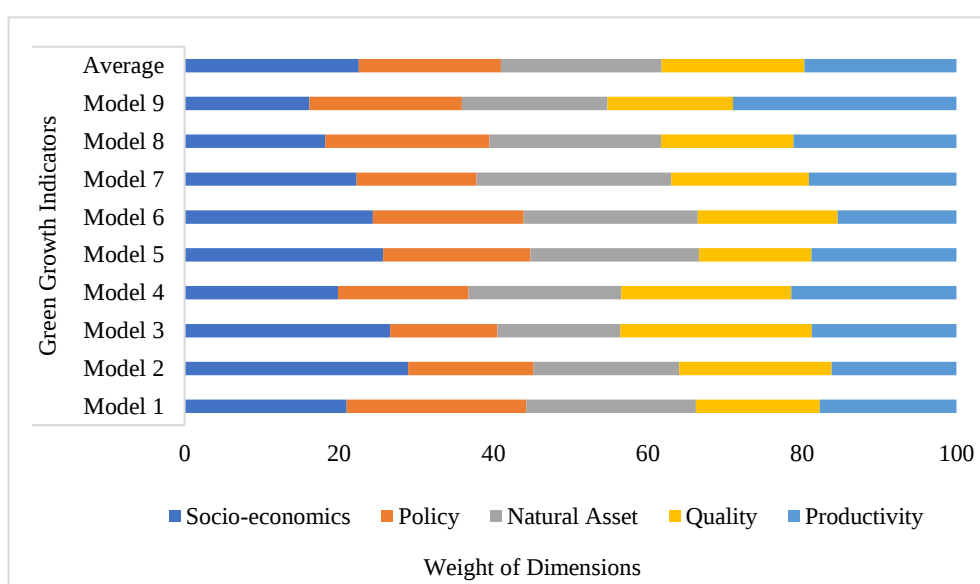
In creating the green index, we will use the approach developed by Sarkodie et al. (2023) in order to calculate the values of the green growth index on the data for Serbia. According to the mentioned authors, green growth includes five dimensions:

- (1) natural asset base that includes data on water, land, forest and wildlife resources, as well as atmosphere and climate data;
- (2) policy responses, which includes data on patents, development assistance, international financial flows, technology and innovation, environmental taxes and transfers, as well as regulations and management;
- (3) socio-economic, which includes data from the social and economic dimensions;
- (4) quality of life that includes data on access to drinking water and exposure to the risk of environmental destruction and
- (5) productivity, which includes data on the productivity of carbon dioxide use, energy productivity, productivity of non-energy materials and environmental productivity.

This choice of five dimensions for creating a green growth index is in line with the analysis of the Organization for Economic Cooperation and Development from 2014, which stated that 25 to 30 indicators are needed to form those five dimensions. This analysis indicates that the proposed dimensions of the indicators are not final and that this proposal gives a clear signal that it is a flexible approach that countries can adapt according to their characteristics. Green growth index in Sarkodie et al. (2023) analysis is based on the creation of a summary index using the method of generalized least squares, where the calculation of the index is based on the application of weighting of five data dimensions – Figure 1. In addition to the aforementioned approach, according to the Global Green Growth Institute, the green growth index can be calculated using data from four dimensions from which 36 indicators can be generated: (1) efficient and sustainable resource use; (2) natural capital protection; (3) green economic opportunities and (4) social inclusion.

On the basis of Figure 1, it can be seen that it is possible to calculate ten models of green growth indices that differ from each other based on the weights used. The models differ from each other in terms of which of the five dimensions of the data is used for calculation, i.e. changing the sign means that the dimension of the data moves in the opposite direction. Within model 1, the opposite sign is used for natural asset base, environmental productivity, and environmental quality, for model 2 there is no use of the opposite sign, for model 3 the opposite sign is used for environmental productivity, for model 4 the opposite sign is used for environmental quality, for model 5 for natural asset base, for model 6 for environmental productivity and quality, for model 7 for environmental productivity, and natural asset base, for model 8 for environmental quality, and natural asset base, for model 9 for policy response, socioeconomics, environmental quality, natural asset base, and environmental productivity. Model 10 means the average of the weights used in the calculation of models 1-9.

Figure 1 - Weight of Dimensions Used to Construct Green Growth Indicators



Source: Sarkodie et al. (2023)

When calculating green growth indices, the first step is the source of the variables, to then perform their classification, treatment of missing data, adjustment of the sign for each variable (where possible), setting submissions for each data dimension and calculation of the index. A fixed value of zero is assigned for missing data. This assigns a lower weight to data dimensions that have missing values. Green growth index is calculated based on the following formula:

$$\hat{s}_{i,j} = \frac{1}{W_{i,j}} \sum_{k \in K_{i,j}} w_{j,k} \frac{y_{i,j,k} - \hat{y}_{j,k}}{\sigma_{j,k}} \quad (1)$$

In the mentioned formula, $\hat{s}_{i,j}$ represents the constructed green growth index, while $W_{i,j}$ and $w_{j,k}$ represent applied weights, and $(y_{i,j,k} - \hat{y}_{j,k})/\sigma_{j,k}$ represents the normalized output based on the inverse covariancematrix which is represented by $\sum_j y_{i,j,k}$. The green growth index implies the combination of several variables into categories, and then several categories into dimensions and finally the construction of the green growth indicator. In the following part of the paper, we will present the results of selected key performance indicators for green transitions on the case of Serbia.

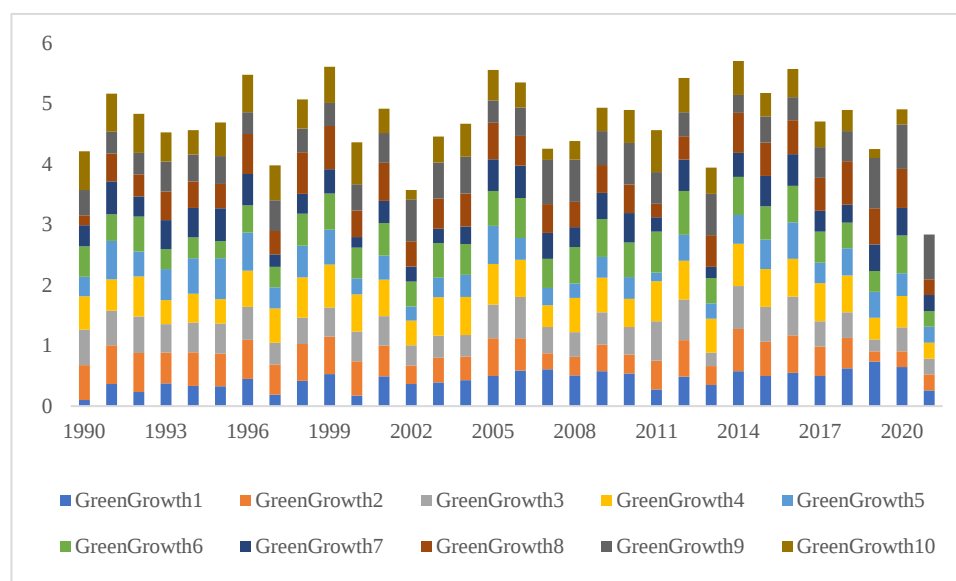
Green Growth Index

In order to analyze the results obtained on the Green Growth Index on the data for Serbia, it is necessary to define what actually constitutes green growth. The concept of green growth itself is a relatively new concept with a number of different definitions and no well-established metrics for tracking it. According to Lyytimäki et al. (2017) green growth is defined as a process of transition towards achieving a low-carbon society and society in which resources will be used in the most efficient way while at the same time achieving economic development that will ensure human well-being, social justice and preservation of the environment. The implementation of this transition will enable the further increase of social wealth and well-being, while preserving the value of products, materials and resources in order to use existing resources rationally. Thus, the goal of green growth policies is to simultaneously mitigate the consequences of climate change while achieving sustainable economic growth (Herman et al., 2023).

Based on the previously analyzed methodology for creating the Green Growth Index, data from 1990 to 2021 (the latest available data) were used to present all ten models of green growth indices based on data for Serbia - Figure 2. When it comes to interpreting the achieved values of the Green Growth Index model, a value of 0 refers to low green performance, while a value of 1 refers to high green performance. The highest value of the green growth index Serbia in the entire analyzed period for all models was achieved within model 9 in 2019, when the value of the index was 0.83. That year, within model 9, the largest contribution came from the productivity dimension, in which the largest contribution was made by productivity of non-energy materials. When it comes to the lowest achieved value, the green growth index reached 0.10 in 1990 in model 1. The most optimal green growth index model is number two, within which a weight of 28.95% refers to the socioeconomic dimension, a weight of 19.74% to quality, a weight of 18.87% refers to the natural asset base, a weight of 16.25% is refers to policy response and a weight of 16.18% on environmental productivity. Based on the presented data on the movement of the green growth index, it can be concluded that the Republic of Serbia has an average level of green development, bearing in mind that the average value of all models in the entire

analyzed period is 0.47. The obtained results indicate that it is necessary for the Republic of Serbia to continue the promotion of green transformations in order to achieve high level of green transition in the coming period.

Figure 2 - Green Growth Indexes for Serbia



Source: compiled by authors according to https://figshare.com/articles/dataset/Comprehensive_green_growth_indicators_across_countries_and_territories/22291069

Green Energy Transition

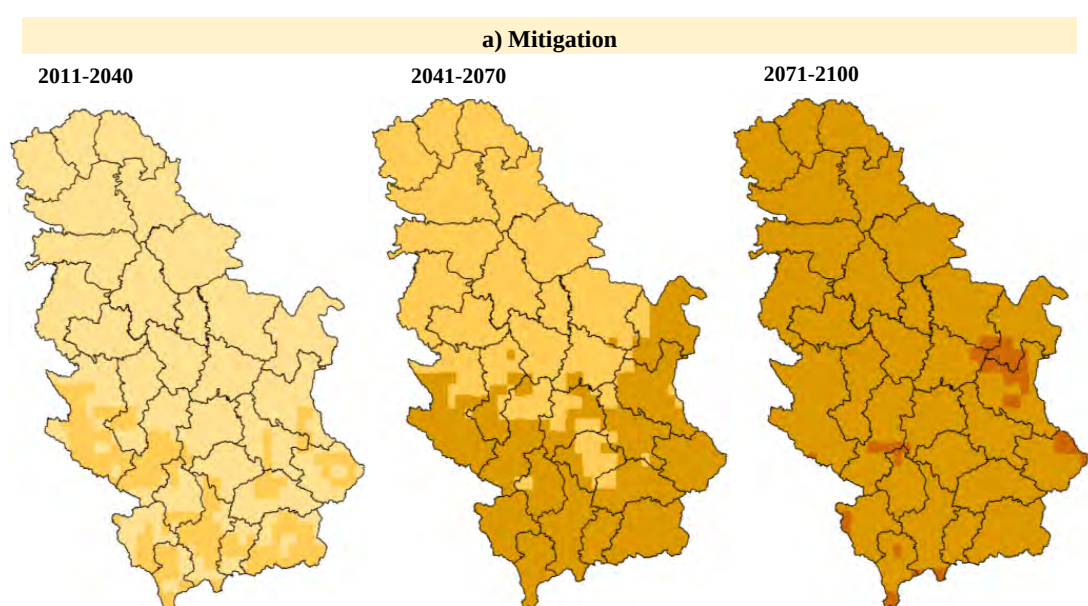
The energy transition represents one of the biggest challenges today, bearing in mind that its implementation represents a change in the supply and consumption of energy in a national energy system. Thus, the energy transition represents a transition to sustainable energy sources in order to mitigate the negative impact of climate change. The goal of the energy transition is to reduce the emission of greenhouse gases in order to reduce the share of electricity production from fossil fuels.

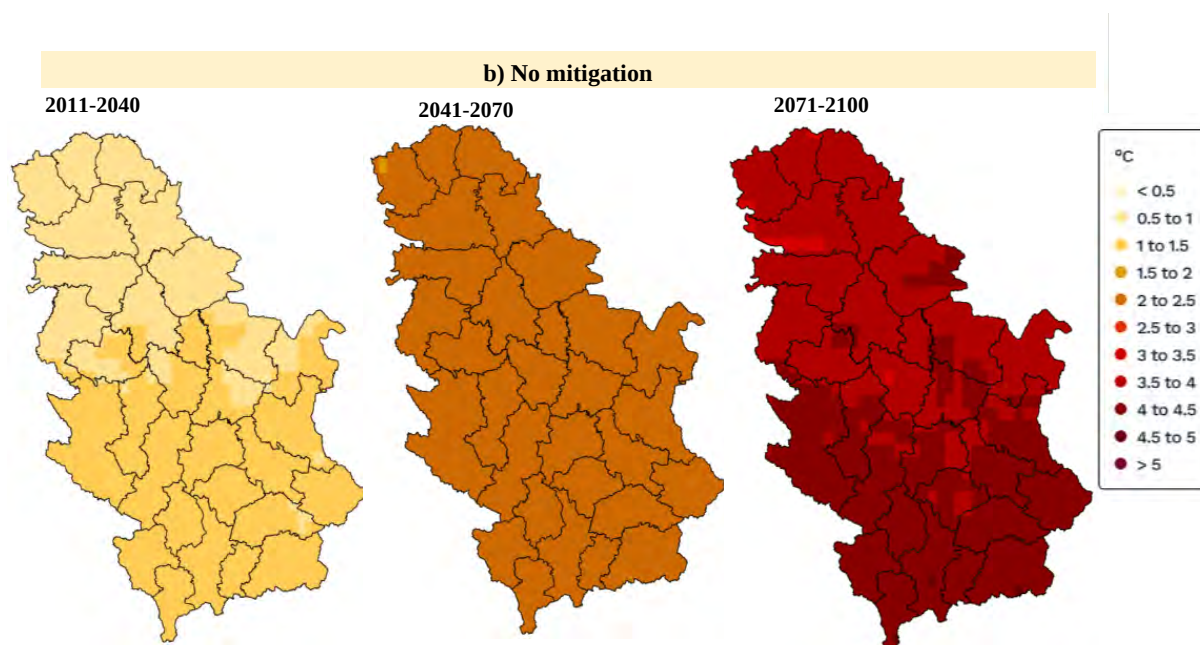
In order to implement the policy of climate neutrality and decarbonization until 2050, as well as charting the path to the energy transition, the Republic of Serbia has ratified and signed a number of international acts. By ratifying the Paris Agreement within the framework of the United Nations on climate change from 2015, Serbia assumed the obligation to reduce greenhouse gas emissions and accepted the need to implement measures and activities leading to adaptation to changed climate conditions, while by signing the Treaty on the Energy Community and Sofia Declaration on the Green Agenda for the Western Balkans, it assumed the obligations of developing the Integrated National and Climate Plan.

In the program of adaptation to changed climate conditions for the period from 2023 to 2030, the Ministry of Environmental Protection of the Republic of Serbia highlights that the country is warming faster and more than the global average. At the global level, the increase in mean temperature is 1.1°C, while in Serbia it is 1.8 °C, and in summer it is even above that level (2.6°C).

In addition, in the period from 2000 to 2020, Serbia recorded losses of as much as 6.8 billion euros as a result of significant changes in weather conditions and extreme climate conditions. Of the stated amount, more than 70% refers to the damage caused by high temperatures and drought, while the other main cause was the floods that were especially devastating in 2014. According to the data of the Republic Hydrometeorological Service of Serbia, the summer of 2024 was the hottest for the period of meteorological measurements from 1951 to 2024, while all three summer months - June, July and August - were also the warmest since 1951. Warm winters in the last few years are in favor of lower electricity consumption, but extremely hot summers lead to higher consumption of electricity during the summer season, and additionally affect lower production from hydrological sources due to low rainfall. If significant changes are not undertaken in the energy system of Serbia and it switches to renewable energy sources, the Republic of Serbia may record a significant increase in energy consumption in the coming period. Based on the interactive map, created by the Digital Climate Atlas of Serbia, it can be seen that the Republic of Serbia is expected to record an increase in temperature in the coming period, especially if it does not implement measures to mitigate the consequences of climate change, including the transition to renewable energy sources. Figure 3 shows projections of the average daily temperature for the entire territory of the Republic of Serbia for three projection periods: 2011-2040, 2041-2070 and 2071-2100. The Representative Concentration Pathways (RCP) 4.5 scenario was used to show the projections of the average daily temperature in the event that climate change mitigation measures were applied, which is based on the projection that the emission of greenhouse gases will stabilize at 4.5 W/m² by 2100. In the case of projections if climate change mitigation measures are not implemented, the RCP 8.5 scenario was used, which implies that the level of carbon dioxide will rise to 936 parts per million by 2100, which would increase the global temperature by about 5-6°C by 2100. This visual representation of the projected average daily temperature can best illustrate the importance of implementing the energy transition.

Figure 3 - Future Climate Projection for Average Daily Temperature for Serbia - Reference Period 1971-2000





Source: compiled by authors according to <https://atlas-klime.eko.gov.rs/eng/map?dataType=obs&visualization=pro&area=regions>

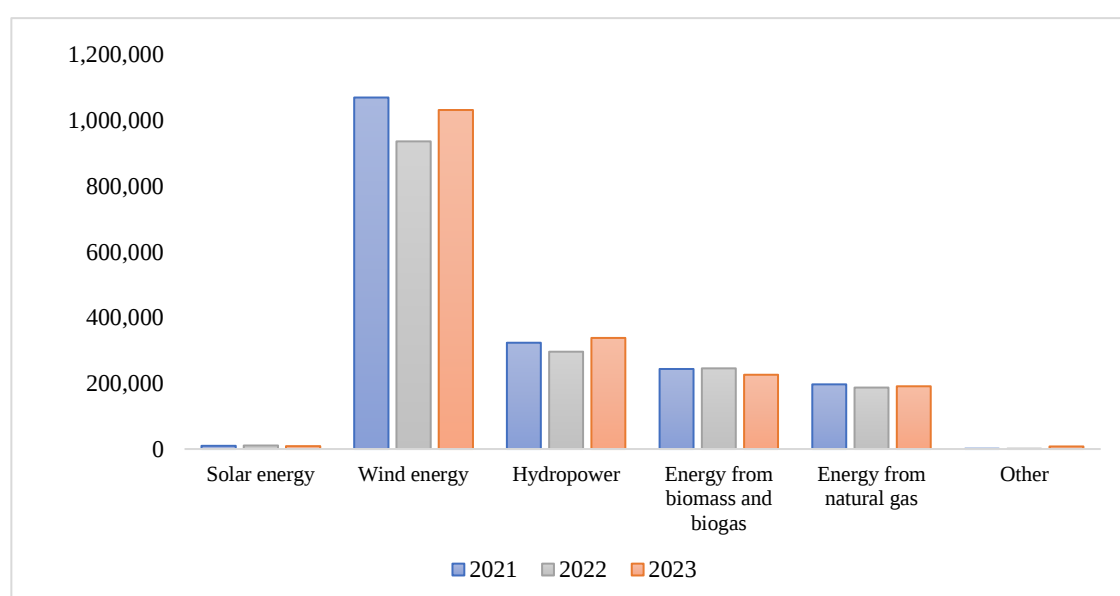
A significant increase in summer temperatures leads to a significant consumption of electricity, which in the Republic of Serbia is mostly generated in thermal power plants (about 70%), while 30% is obtained from 16 hydropower plants. Coal from surface mines is mostly used in thermal power plants, mostly lignite. The presented data indicate that most of the electricity in Serbia is generated from fossil fuels.

According to the projections of the Energy Development Strategy of the Republic of Serbia until 2025 with projections until 2030, which was adopted at the beginning of December 2015, the total potential of renewable energy sources in our country amounts to 5.65 million tons of oil equivalents per year. To regulate matters related to renewable energy sources, their participation in gross final energy consumption, as well as the integration of energy from renewable sources for the market, the Republic of Serbia adopted the Law on the Use of Renewable Energy Sources in April 2021. After two years, in April 2023, the Law on Amendments to the Law on the Use of Renewable Energy Sources was adopted, which entered into force at the beginning of May 2023. These amendments to the Law established the integration of renewable energy sources into the power system, with an effort to ensure the safe operation of the system.

The largest producer of electricity in Serbia is Elektroprivreda Srbija, whose goal is to gradually increase capacity from renewable energy sources while at the same time achieving carbon neutrality and implementing measures to protect the environment. According to the data of the Elektroprivreda Srbija, in 2023, 1,806,631.76 MWh of electricity was produced from renewable source of energy.

Wind energy has the largest share in renewable energy sources, with a share of 57.2% in 2023, followed by hydropower (18.8%) and energy from biomass and biogas (12.5%) - Figure 4. In the following period, the goal of Elektroprivreda Serbia remains to continue investing in the environment, as well as implementing development plans related to the increase in the share of renewable energy sources. By 2030, the goal is for Elektroprivreda Srbije to invest about 3.5 billion euros in new renewable sources, primarily in hydropower and solar power, which in that period will represent about 37% of the company's total investments. If investments in new hydropower plants are included, the total investments in renewable energy sources of the Electric Power Company of Serbia by 2030 will amount to around 5.4 billion euros, i.e. more than half of the total investments.

Figure 4 - Electricity Production from Renewable Sources in Serbia (in MWh)



Source: compiled by authors according to <https://www.eps.rs/cir/Pages/tehnicki-izvestaji.aspx>

A major contribution to the increase in the share of renewable energy sources was made by the Ministry of Mining and Energy, which has so far announced two auctions for obtaining bids for renewable energy sources. The goal is to provide 1,300 MW from green energy through the incentive system for a period of three years (2023-2025). The first auction was held in mid-August 2023, where 16 investors applied for a total power plant of 816.48 MW, of which 602.8 MW was offered to fill the quota, while the estimated investment value of all power plants is 1.26 billion euros. Out of the total number of registered investors, 11 participants qualified for the bidding phase. In the auction procedure for wind power plants, the quota was filled by four investors, while in the solar power plant auction, the quota was filled by three. The lowest price offered was 64.48 euros per megawatt-hour (EUR/MWh) for wind power plants or 88.65 euros per megawatt-hour for solar power plants. In February 2024, the Ministry of Mining and Energy announced that it would organize a second round of auctions for a new 400 MW capacity from renewable energy sources by the end of 2024. At the end of November 2024, the Ministry of Mining and Energy announced the second round of auctions for the allocation of market premiums for renewable energy sources, at which investors will compete for the allocation of quotas of a total of 424.8 MW (300 megawatts planned for wind farms, and 124.8 MW for solar power plants).

important topic, both for household budgets and for environmental protection. For subsidies that, depending on the package of measures, can go up to 65 percent of the investment value. Implementing energy efficiency measures brings many advantages, such as saving money, increasing the comfort of living, and increasing the value of the property you live in.

Green Finance Instruments

The movement of important macroeconomic indicators is undoubtedly impacted by global warming and its effects on climate change, which forces those who design economic policies to carry out the green transformation process. To achieve this, green financial instruments that take social and environmental factors into account when making investment decisions must be developed. This will encourage more investments in ecologically sustainable operations. Green finance plays a significant role in funding initiatives that aim to enhance the overall well-being of the economy and society as well as achieving global goals outlined in strategic programs like the European Green Deal and the Agenda for Sustainable Development until 2030, both of which have as their primary objective the reduction of greenhouse gas emissions. Thus, reaching the objectives of the green economy poses both a challenge and a chance for the financial sector to create sustainable funding. Sustainable financing can be seen through a wide range of activities: from digitalization of bank activities, reducing carbon levels in their daily activities, to offering sustainable financial products (Sredojević and Sredojević, 2021). In addition to commercial banks, central banks also play a significant role in the development of green financial instruments, which in the last few years have been exposed to new challenges and tasks that they need to face. One of those challenges is climate change, which directly affects the main objectives of the central bank, which is to achieve and maintain price and financial stability (Martin, 2022).

The issuance of green financing instruments has been increasing rapidly over the last few years, and more growth is anticipated in the near future. The financing of businesses, projects, and other endeavors that help achieve sustainable, equitable, and growth is referred to here, as it directly advances the objectives of sustainable development. In light of this, the trend of "greening" finance is becoming more and more significant, owing to the public's growing interest in environmental preservation and protection as well as the increased flow of information, mostly via the media. It is a movement that emerged from the necessity to reframe profit as the primary objective and instead frame it as striking a balance between profit and environmental preservation. Green development is a global movement that is being pushed by the most powerful international organizations, and it is one of the top priorities. The banking sector in Serbia is becoming more and more involved in this area and understands the benefits of funding environmentally friendly initiatives. Thus far, the most prevalent loan approvals have gone to wind farm development, recycling, solar energy, water purification, and power sector projects with the goal of lowering CO₂ emissions. Loans for the purchase of electric vehicles, green agricultural investment loans, loans for projects with high energy efficiency, and investment loans in the field of renewable energy sources are all becoming more popular. The bank encourages an individual or business to make environmentally friendly decisions by setting lending circumstances, which include the interest rate, amount of collateral, and other advantages or loan components. By lowering funding requirements and constraints, particularly for projects that do not harm the environment, funding priorities were established.

Achieving sustainable economic growth and advancing sustainable financing on the global financial market are priorities for the Republic of Serbia. Together with the continuous growth of traditional financial instruments, sustainable financial tools are also advancing (Martin, 2023). To date, the Republic of Serbia has released two sustainable financial instruments: a green bond in September 2021 and a sustainable bond in June 2024. For the first time in its history, the Republic of Serbia issued a

1.0-billion-euro green Eurobond in mid-September 2021. The bond had a seven-year maturity, a yield rate of 1.26%, and the lowest coupon rate ever recorded - 1.00%. The Republic of Serbia became one of the few nations in Europe - and the only one not part of the European Union - when it first issued the green instrument. The International Capital Markets Association's Green Bond Principles were followed in the issuance of the green bonds, and the Republic of Serbia's September 2021 publication of the Green Bond Framework governed the use of the collected funds. In June 2022, the Republic of Serbia received the "Sovereign Green Market Pioneer in 2021" award from Climate Bond Initiative, demonstrating our nation's environmental consciousness.

The Republic of Serbia successfully floated dollar sustainable Eurobonds on the global financial market at the beginning of June 2024. The proceeds from the sale of the bonds will go toward financing environmentally conscious projects and socially conscious endeavors. The overall quantity of securities sold was 1.5 billion dollars, but during the day, investor demand was far higher and exceeded 6.5 billion dollars. As with other dollar Eurobond issuance, the Republic of Serbia also completed hedging contracts to lower the public debt's interest rate and foreign exchange risk and demonstrate accountability for its sustainability. Through these transactions, it quickly applied a cross-currency swap to transform obligations based on the issuance of dollar Eurobonds into liabilities in euros. The Republic of Serbia concluded this hedging transaction with Deutsche Bank AG, Bank of America, BNP Paribas and MUFG Securities (Europe) N.V. This decreased the Republic of Serbia's actual cost of borrowing, bringing it down to 4.75% after hedging for the Eurobond, in addition to lowering the exposure to the foreign exchange risk of the dollar's movement against the euro. The Sustainable Finance Framework of the Republic of Serbia and the Second Party Opinion (SPO) on the Sustainable Finance Framework, which was created by the Public Debt Administration, Ministry of Finance, were followed in the issuance of both green bond offerings. These documents demonstrate the Republic of Serbia's commitment to achieving the objectives of the sustainable development agenda in order to create a sustainable future for coming generations. This lends credence to national decarbonization and environmental conservation.

Conclusion

The goal of the green transition is the development and implementation of green and sustainable solutions in order to preserve the environment. Today, climate change is a global threat that requires urgent action to remedy the consequences of these changes. This gives the possibility, depending on the applied measures, to create a resource-efficient, modern and competitive economy based on the application of green technology and sustainable business solutions. Turning climate and environmental challenges into opportunities will make the transition just and inclusive for all. Serbia, as a candidate for membership in the Union, keeps pace with the requirements, bringing plans, measures and activities in the field of green transition.

In order to monitor progress and success in the implementation of green transition measures, it is necessary to select and closely monitor key performance indicators in green transition, whereby their selection should be adapted to the characteristics of the economy of each specific country. The aim of this paper is to present key performance indicators in green transition on the example of Serbia, where we have presented three: green growth index, green energy transition and green finance instruments. The formation of the green growth index is based on the methodology developed by Sarkodie et al. (2023) which represents the creation of a summary index using the method of generalized least squares, where the calculation of the index is based on the application of weighting of five data dimensions (socio-economics, policy, natural asset, quality and productivity).

The analysis showed that in the analyzed period (1990-2021), Serbia had an average green growth index value of 0.47 according to all models, which indicates that the country has an average level of green transition. The above result indicates the necessity for Serbia to continue implementing the green transformation in order for the value of the index to be close to 1, which represents the value of high green performance.

In the field of green energy transition, Serbia has ratified and signed a large number of international agreements (such as the Paris Agreement, Sofia Declaration on the Green Agenda for the Western Balkans and Treaty on the Energy Community) with the aim of achieving climate neutrality and decarbonization. As the summers become hotter and the production of electrical energy from hydropower decreases due to less precipitation, it is necessary to increase the participation of renewable energy sources such as solar and wind energy. In order to achieve the above, the Republic of Serbia adopted the Law on the Use of Renewable Energy Sources in April 2021, and amended it two years later. The largest producer of electricity in Serbia is Elektroprivreda Srbija, which generates the largest part of renewable energy sources from wind energy, followed by hydropower and energy from biomass and biogas. The goal of this company is to invest around 3.5 billion euros in renewable energy sources by 2030. A major contribution to the green transition in the field of energy is provided by the Ministry of Mining and Energy, which has a plan to generate 1,300 MW from green energy sources until 2025. In order to achieve this ambitious goal, the ministry organizes auctions for obtaining bids for renewable energy sources, signs contracts with international financial organizations, such as the European Bank for Reconstruction and Development, in order to increase the share of renewable energy sources and provides subsidies for households to replace worn-out carpentry, facades, insulation, and inefficient boilers, but also to install solar collectors and panels for the production of electricity for their own needs. All of the above contributes to the strengthening of the energy capacities of the country, which are based on the preservation of the environment.

In order to implement the green transition, significant investments are required. In this regard, it is important to actively work on the development of green financial instruments. The Republic of Serbia has so far issued two sustainable financial instruments: a green bond in September 2021 and a sustainable bond in June 2024. In mid-September 2021, for the first time on the international financial market, it issued a green Eurobond of one billion euros with a maturity of seven years. This green bond had a yield rate of 1.26% and a coupon rate of 1.00%. At the beginning of June 2024, the Republic of Serbia issued a sustainable Eurobond of 1.5 billion dollars with a maturity of ten years and a coupon rate of 6.00% on the international financial market. Funds raised from this emission will invest into several programs defined by the green agenda, as well as socially conscious ventures.

The analysis showed that the Republic of Serbia, based on the presented results of the three green performance indicators, achieved significant results in the field of green transformation, with the necessity to continue the work focused on building an energy-efficient economy that bases its competitiveness on the principles of sustainability. All this is in line with the country's strategic determination in the accession negotiations for membership in the European Union and the achievement of the goals of the green agenda to achieve climate neutrality at the level of the European Union by 2050.

The green transition topic is highly motivating for future research that could address additional analysis of energy efficiency, including examining energy efficiency models, highlighting the need for public awareness and the role of education in putting effective energy efficiency strategies into practice, and investigating the relationship between environmental protection, economic growth, and energy efficiency. Given the increasing need to approve loans for the purchase of electric vehicles, green agricultural loans, loans for energy efficiency implementation projects, and investment loans in areas of

renewable energy sources, more research on green financial instruments could be done on the data of particular banks and other financial institutions. According to the aforementioned, central banks and financial regulators need to work together to encourage the growth of green finance and the creation of a green economy within their respective purviews.

References

1. Acosta, L., Maharjan, P., Peyriere, H. and Mamiit, R. (2020). Natural capital protection indicators: Measuring performance in achieving the Sustainable Development Goals for green growth transition, *Environmental and Sustainability Indicators*, 8 (2020), pp. 1-21, <https://doi.org/10.1016/j.indic.2020.100069>.
2. Airò Farulla, G., Tumminia, G., Sergi, F., Aloisio, D., Cellura, M., Antonucci, V. and Ferraro, M. (2021). A Review of Key Performance Indicators for Building Flexibility Quantification to Support the Clean Energy Transition, *Energies*, 14 (18), pp. 1-14, <https://doi.org/10.3390/en14185676>.
3. Barry, D. and Hoyne, S. (2021). Sustainable measurement indicators to assess impacts of climate change: Implications for the New Green Deal Era. *Current Opinion in Environmental Science & Health*, 22 (2021), pp. 1-6, <https://doi.org/10.1016/j.coesh.2021.100259>.
4. Cheba, K., Bąk, I., Szopik-Depczynska, K. and Ioppolo, G. (2022). Directions of green transformation of the European Union countries, *Ecological Indicators*, 136 (108601), pp. 1-15, <https://doi.org/10.1016/j.ecolind.2022.108601>.
5. Dahaeva, F. and Amirova, A. (2023). „Sustainable Development Goals and Green Economy Indicators“ in *Proceedings of the 1st International Conference on Methods, Models, Technologies for Sustainable Development*, pp.136-140.
6. Digital Climate Atlas of Serbia: <https://atlas-klime.eko.gov.rs/eng/map?dataType=obs&visualization=pro&area=regions>. (accessed 7 October 2024).
7. Electronic resource: https://figshare.com/articles/dataset/Comprehensive_green_growth_indicators_across_countries_and_territories/22291069. (accessed 8 October 2024).
8. Elektroprivreda Srbije: <https://www.eps.rs/cir/Pages/tehnicki-izvestaji.aspx>. (accessed 8 October 2024).
9. European Commission (2009), „Key Performance Indicators for Environmental, Social & Governance“, available at: <https://ec.europa.eu/docsroom/documents/1547/attachments/1/translations/en/renditions/pdf> (accessed 14 October 2024).
10. Franco, A., Misericocchi, L. and Testi, D. (2023). Energy Indicators for Enabling Energy Transition in Industry. *Energies*, 16 (581), pp. 1-18, <https://doi.org/10.3390/en16020581>.
11. Global Green Growth Institute, Green Growth Index: <https://greengrowthindex.gggi.org/wp-content/uploads/201/#introduction>. (accessed 16 October 2024).
12. Herman, K., Jae Kim, Y., Shayegh, S. and Xiang, J. (2023). A critical review of green growth indicators in G7 economies from 1990 to 2019, *Sustainability Science*, 18 (2023), pp. 2589–2604, <https://doi.org/10.1007/s11625-023-01397-y>.
13. Lyytimäki, J., Antikainen, R., Hokkanen, J., Koskela, S., Kurppa, S., Känkänen, R. and Seppälä, J. (2017). Developing Key Indicators of Green Growth, *Sustainable Development*, 13 (2017), pp. 1-14, <https://doi.org/10.1002/sd.1690>.
14. Martin, V. (2022). Climate change and the role of central banks, *Bankarstvo*, 51 (2), pp. 86-116, doi: 10.5937/bankarstvo2202086M.
15. Martin, V. (2023). Green Finance: Regulation and Instruments. *Journal of Central Banking Theory and Practice*, 12 (2), pp. 185-209, <https://doi.org/10.2478/jcbtp-2023-0019>.
16. Ministry of Environmental Protection of the Republic of Serbia: <https://www.ekologija.gov.rs/sites/default/files/2024-01/program-prilagodjavanja-na-izmenjene-klimatske-uslove-za-period-od-2023-do-2030-godine.pdf>. (accessed 18 October 2024).

17. OECD, ESG Investing: Environmental Pillar Scoring and Reporting: https://www.oecd-ilibrary.org/finance-and-investment/esg-investing_80680dc8-en. (accessed 27 November 2024).
18. OECD, ESG ratings and climate transition: https://www.oecd.org/en/publications/esg-ratings-and-climate-transition_2fa21143-en.html. (accessed 27 November 2024).
19. OECD, Global Corporate Sustainability Report 2024: https://www.oecd.org/en/publications/global-corporate-sustainability-report-2024_8416b635-en.html. (accessed 27 November 2024).
20. OECD, Green Growth Indicators 2014: https://www.oecd.org/en/publications/green-growth-indicators-2013_9789264202030-en.html. (accessed 16 October 2024).
21. Petrović Tomić, N. (2023). Sustainable business – are ESG standards powering the resilience of a new business model?, *Bankarstvo*, 52 (2-3), pp. 202-221, doi: 10.5937/bankarstvo2303202P.
22. Republic Hydrometeorological Service of Serbia: <https://www.hidmet.gov.rs/data/klimatologija/latin/leto.pdf>. (accessed 18 October 2024).
23. Rotondo, F., Perchinunno, P., L'Abbate, S. and Mongelli, L. (2022). Ecological transition and sustainable development: integrated statistical indicators to support public policies. *Scientific Reports*, 12 (18513), pp. 1-12, <https://doi.org/10.1038/s41598-022-23085-0>.
24. Ryszawska, B. (2014). „Towards a green economy“ in *From ideas to practice Chapter: Green Economy Indicators*, Wydawnictwo Uniwersytetu Łódzkiego, Łódź, Poland, pp. 31-52.
25. Sarkodie, S. Asantewaa Owusu, P. and Taden, J. (2023). Comprehensive green growth indicators across countries and territories, *Scientific Data*, 10 (413), pp. 1-19, <https://doi.org/10.1038/s41597-023-02319-4>.
26. Sredojević, S. and Sredojević, D. (2021). Sustainable finance – evolution or revolution in the banking sector, *Bankarstvo*, 50 (2), pp. 114-151, doi: 10.5937/bankarstvo2102114S.
27. Timonen, K., Reinikainen, A., Kurppa, S. and Riipi, I. (2021). Key Indicators and Social Acceptance for Bioenergy Production Potential as Part of the Green Economy Transition Process in Local Areas of Lapland. *International Journal of Environmental Research and Public Health*, 18 (527), pp. 1-20, <https://doi.org/10.3390/ijerph18020527>.
28. UN, Global Sustainable Development Report 2023: https://sdgs.un.org/gedr/gedr2023?utm_source=chatgpt.com. (accessed 28 November 2024).
29. UN, Sustainable Development Goals (SDGs) Report 2023: https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf. (accessed 28 November 2024).
30. Vukovic, N., Pobedinsky, V., Mityagin, S., Drozhzhin, A. and Mingaleva, Z. (2019). A Study on Green Economy Indicators and Modeling: Russian Context, *Sustainability*, 11 (2019), pp. 1-13, doi:10.3390/su11174629.

Datum prijema: 14.07.2024. god.
Datum prihvatanja: 13.11.2024. god.

ODRŽIVOST I ORGANIZACIONO PONAŠANJE U BANKARSKOM SEKTORU U SAVREMENOM POSLOVNOM OKRUŽENJU: STUDIJA SLUČAJA ODRŽIVIH BANAKA

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Rezime: Ovaj rad istražuje održivost i organizaciono ponašanje u bankarskom sektoru, fokusirajući se na ključne karakteristike, procese i aktivnosti koje odlikuju održive banke. U radu se naglašava uloga banaka u društveno odgovornom ponašanju i stvaranju dugoročne vrednosti za stejkholdere. Primenom kabinetskog istraživanja i studije slučaja banaka sa zanemarljivim rejtingom izloženosti ESG rizicima, u radu je identifikovano da posmatrane banke daju prioritet ekološkim, društvenim i upravljačkim faktorima u svom poslovanju. Navedena posvećenost je vidljiva u njihovim praksama odgovornog kreditiranja, zelenog finansiranja i inicijativama usmerenim ka pozitivnom društvenom uticaju. Studije slučaja bankarskih grupa Eurobank i Intesa Sanpaolo, koje posluju u Republici Srbiji i imaju zanemarljivu izloženost ESG rizicima, oslikavaju uspešnu primenu održivih bankarskih praksi, ističući njihove pozitivne efekte na upravljanje rizicima, reputaciju i održivu profitabilnost. Održivo bankarstvo i organizaciono ponašanje postaju sve značajniji u oblikovanju otpornog finansijskog sektora i stvaranju održive budućnosti.

Ključne reči: održivost, organizaciono ponašanje, savremeno poslovanje, studija slučaja, održive banke, ESG rejting

JEL klasifikacija: Q56, M14, G21

Uvod

Organizaciona održivost obuhvata načine na koje organizacije mogu da integrišu ekološke, društvene i ekonomske aspekte u svoje prakse, aktivnosti i procese donošenja odluka (Schaltegger & Wagner, 2006). Schaltegger i Lüdeke-Freund (2012) definišu održivost kao ciljano i uspešno ostvarivanje ekonomske dobiti kroz promišljeno oblikovanje dobrovoljnih praksi upravljanja životnom sredinom i društvenim pitanjima. Ovaj koncept se razlikuje od tradicionalnog poslovnog pristupa i načina razmišljanja, jer ga ne pokreće isključivo maksimizacija profita već i posvećenost u rešavanju društvenih i ekoloških izazova. Ove aktivnosti prevazilaze poštovanje zakonskih propisa i proširuju se izvan okvira aktivnosti koje bi bile preduzete isključivo iz ekonomskih razloga. Ipak, ne treba izgubiti iz vida da sve preduzete aktivnosti moraju generisati merljiv i pozitivan uticaj na ekonomski uspeh kompanije. Schaltegger i saradnici (2012) ističu da su korporativne strategije održivosti ključne za kompanije kako bi uspešno odgovorile na društvene, pravne, političke i ekonomske zahteve, a istovremeno ostale konkurentne. Autori su identifikovali nekoliko ključnih pokretača koji mogu da utiču na ekonomski uspeh odgovornih i održivih inicijativa kompanija. Ovi pokretači uključuju smanjenje troškova i povećanje efikasnosti, smanjenje rizika od kazni, smanjenje eksternih efekata, povećanje prodaje i profitne marže, unapređenje reputacije i vrednosti brenda, privlačnost kompanije kao poslodavca i inovativne pristupe. Uticaj svakog pokretača može da varira u zavisnosti od specifičnih aktivnosti održivosti koje sprovodi kompanija. Samim tim, bez obzira na pristup, održivo poslovanje obuhvata akcije, prakse i odluke koje minimiziraju negativne uticaje i maksimiziraju pozitivne uticaje na životnu sredinu, društvo i ekonomiju. Ono podrazumeva uravnoteženje kratkoročnih dobitaka sa dugoročnom dobrobiti kompanije (Goetsch & Davis, 2014). Iako je prvobitno bilo fokusirano na proizvodne grane i industrije koje intenzivno koriste resurse, održivo poslovanje je poslednjih godina dobilo na značaju i u sektoru usluga, posebno u bankarstvu.

U bankarskom sektoru, održivo poslovanje podrazumeva integraciju faktora zaštite životne sredine, društvene odgovornosti i korporativnog upravljanja (u nastavku: ESG, gde E potiče od reči Environmental (životna sredina), S od reči Social (društvena zajednica) i G od reči Governance (upravljanje)) u poslovanje banaka. Opisano uključuje odgovorne prakse kreditiranja, ulaganje u održive projekte, smanjenje ekološkog otiska poslovanja i promovisanje finansijske inkluzije. Među različitim inicijativama, banke i bankarski sektor igraju značajnu ulogu u ostvarivanju ambicioznih ciljeva oličenih u široko prihvaćenom konceptu neto nulte emisije gasova sa efektom staklene bašte, kao i pretvaranju evropskog kontinenta u prvi klimatski neutralan kontinent do 2050. godine. Održivo bankarstvo predstavlja koncept u razvoju koji je dobio na značaju usled rastuće globalne svesti o ekološkim, društvenim i finansijskim problemima. Osnovna ideja održivog bankarstva je usklađivanje potreba sadašnje generacije bez ugrožavanja sposobnosti budućih generacija da zadovolje svoje potrebe (Riegler, 2023).

Cilj ovog rada je da ispita i analizira ključne karakteristike banaka koje se ponašaju na održiv način, kao i da ukaže na ključne procese i aktivnosti koji ove održive i ekološki odgovorne banke čine prepoznatljivim. Značaj održivog poslovanja u bankarskom sektoru je od izuzetne važnosti. Kao što Eccles i saradnici (2014) ističu, finansijske institucije igraju ključnu ulogu u oblikovanju ekonomija i društava, a njihove operativne prakse imaju dubok uticaj na različite stejkholdere. Proučavanjem oblasti održivog poslovanja, istraživači mogu da steknu vredna saznanja, kao i da identifikuju pristupe i strategije koje pokreću pozitivne promene u bankarskom sektoru, što potvrđuju i rezultati preko 2000 empirijskih studija koje su u svom radu analizirali Friede i saradnici (2015).

Održivo bankarstvo – definicije i ključne prednosti

Održivo bankarstvo može da se definiše kao pouzdan bankarski sistem koji uzima u obzir potrebe svih stejkholdera, kako unutar tako i izvan organizacije, i uspostavlja ravnotežu između finansijskih i nefinansijskih faktora. Ono daje prioritet društvenim i ekološkim aspektima u svojim aktivnostima, fokusirajući se ne samo na kratkoročne, već i na dugoročne efekte. Održivo bankarstvo doprinosi ukupnoj stabilnosti i otpornosti finansijskog sistema, poštovanjem etičkih vrednosti i efikasnim upravljanjem rizicima, uz istovremenu težnju ka uravnoteženju interesa svih stejkholdera (Rebai et al., 2016).

Bankarski sektor ima značajnu i važnu ulogu u održivom razvoju zbog svoje uloge posrednika u ekonomiji (Aracil et al., 2021). Banke imaju uticaj na druge industrije i mogu da doprinesu ostvarivanju ciljeva održivog razvoja kroz učešće u ekološkim projektima, usmeravanje sredstava na osnovu ekoloških rizika i promovisanje društveno odgovornih proizvoda i usluga (Riegler, 2023). Održive banke se u literaturi označavaju različitim nazivima, uključujući zelene banke, etičke banke, društveno odgovorne banke i eko-banke (Aracil et al., 2021). Ramnarain i Pillay (2016) ističu da je održivo bankarstvo holistički pristup koji prevazilazi ekološko poslovanje. Ono uključuje način na koji banke koncipiraju, grade i vode svoje poslovanje na dugi rok, uzimajući u obzir sve resurse i obuhvatajući organizacionu kulturu, poslovne inovacije, operativnu izvrsnost, društvenu odgovornost i fokus na klijente. Održivo bankarstvo predstavlja multidimenzionalni koncept koji ima za cilj da integriše ekološka i društvena razmatranja u osnovne operacije finansijskih institucija (Aker & Mondal, 2023). Ono obuhvata niz praksi, uključujući zeleno finansiranje, korporativnu društvenu odgovornost i finansijsku inkluziju. Zeleno finansiranje podrazumeva usmeravanje finansijskih sredstava ka projektima i inicijativama koji imaju pozitivan uticaj na životnu sredinu, kao što su: obnovljivi izvori energije, energetska efikasnost i upravljanje otpadom. Nosratabadi i saradnici (2020) sugerišu da banke mogu da implementiraju principe održivosti kroz različite strategije, uključujući upravljanje otpadom, upravljanje potrošnjom vode i energije, kao i osnaživanje zaposlenih. Autori ističu da prelazak na održivost zahteva složene procese i da može da se realizuje kroz inovativne usluge, nove pristupe kreiranju i pružanju usluga, kao i nove oblike poslovnih partnerstava. Autori naglašavaju da su održivi poslovni modeli ključni za banke kako bi oblikovale održive vrednosti i stekle sveobuhvatno razumevanje svojih poslovnih aktivnosti.

Održivo bankarstvo postaje sve značajnije zbog rastuće potrebe za rešavanjem pitanja klimatskih promena i ključnom ulogom finansijskog sektora u ovom poduhvatu. Prelazak na niskougljenu ekonomiju zahteva značajna finansijska ulaganja u zelene tehnologije i infrastrukturu. Banke, kao najznačajniji subjekti na strani izvora finansiranja, mogu da preuzmu značajnu ulogu u usmeravanju finansijskih tokova ka održivim projektima i preduzećima (De Haas, 2023). Isto tako, društveni aspekt održivog bankarstva naglašava odnos banke sa svojim zaposlenima, klijentima i širom zajednicom. To uključuje promovisanje finansijske inkluzije, podršku projektima socijalne dobrobiti i obezbeđivanje fer radnih praksi (Saxena et al., 2021). Banke treba da se fokusiraju na regrutovanje i zadržavanje zaposlenih koji poseduju neophodne veštine za postizanje održivosti. Pored toga, banke često obezbeđuju različite programe obuke kako bi popunile nedostatak veština i održale motivaciju zaposlenih. Ulaganje u ljudski kapital može da unapredi učinak zaposlenih i da doprinese ukupnoj održivosti banke. Zaposleni koji imaju odgovarajuće veštine i koji su motivisani i angažovani, mogu da unaprede održivost na nivou banaka u kojima su zaposleni (Azizzadeh et al., 2022).

Tipologija banaka u pogledu njihovog održivog razvoja može da se objasni kroz različite faze kroz koje banke uobičajeno prolaze dok integrišu održivost u svoje poslovanje. Tipologija koju je predložio Jeucken (2001) zasnovana je na ideji da banke napreduju kroz četiri faze, od odbrambenog stava do održivog bankarstva. Ključne faze i njihovi opisi predstavljeni su u Tabeli 1.

Tabela 1 - Ključne faze razvoja održivog bankarstva

Faza	Opis
Odbrambeno bankarstvo	U ovoj početnoj fazi, banke zauzimaju odbrambeni stav prema ekološkim pitanjima, doživljavajući ih kao potencijalne pretnje svojim interesima. Banke se najčešće protive ili ignorišu sve inicijative koje su posvećene održivosti.
Preventivno bankarstvo	U ovoj fazi, banke počinju da prepoznaju potencijalne uštede i rast efikasnosti povezane sa ekološki prihvatljivim praksama. One polako usvajaju pojedine ekološke mere, često inicirane regulatornim zahtevima ili pritiskom društvene zajednice.
Ofanzivno bankarstvo	U ovoj fazi banke prevazilaze interne prakse i aktivno teže promovisanju održivosti kroz svoje eksterne aktivnosti. One razvijaju i plasiraju ekološki prihvatljive proizvode, razmatraju društvena pitanja i traže rešenja koja donose korist i za banku i za životnu sredinu.
Održivo bankarstvo	Ovo je najnaprednija faza, gde je održivost potpuno integrisana u poslovnu strategiju banke, njene proizvode i usluge i dugoročne ciljeve. Banke teže da budu profitabilne na duži rok uz značajan i aktivan doprinos održivom razvoju.

Izvor: prilagođeno prema Jeucken, M. (2001). *Sustainable finance and banking: The financial sector and the future of the planet*. London: Routledge. <https://doi.org/10.4324/9781849776264>

Predstavljena tipologija banaka je značajna za razumevanje evolucije stavova i aktivnosti banaka koje se kreću na putu prema održivosti. Ona ističe različite faze integracije održivosti u bankama i rastući naglasak ekoloških i društvenih izazova sa kojima se banke suočavaju.

Održivo bankarstvo ima brojne prednosti, među kojima su (Ramnarain & Pillay, 2016; Nosratabadi et al., 2020):

- **Finansijski rezultati:** Banke koje daju prioritet održivosti često ostvaruju bolje finansijske rezultate u pogledu vrednovanja, dobitka/gubitka i prinosa na kapital. Inicijative održivosti, iako mogu da zahtevaju značajna početna ulaganja, najčešće dovode do dugoročnog smanjenja troškova i povećanja profitabilnosti. Na primer, upravljanje potrošnjom energije i vode može značajno da smanji operativne troškove.
- **Upravljanje rizicima:** Održive bankarske prakse pomažu u upravljanju ekološkim i društvenim rizicima povezanim sa investicijama i kreditnim aktivnostima.
- **Poverenje zainteresovanih strana:** Rešavanjem ekoloških, društvenih i upravljačkih pitanja, banke mogu da izgrade i ojačaju poverenje među zainteresovanim stranama, uključujući klijente, investitore i donosioce odluka.
- **Dugoročna održivost:** Održivo bankarstvo obezbeđuje dugoročnu održivost bankarskog sektora uzimajući u obzir uticaj finansijskih aktivnosti na životnu sredinu i društvo.
- **Usklađenost sa propisima:** Kako se propisi sve više fokusiraju na održivost, banke koje usvajaju održive prakse su u boljoj poziciji jer na lakši način mogu da se usklade sa ovim zahtevima.

- Inovacije i rast: Održivo bankarstvo može da podstakne inovacije i otvori nove poslovne mogućnosti u oblastima kao što su zeleno finansiranje i ulaganja sa društvenim uticajem. Težnja ka održivosti često pokreće inovacije u proizvodima, uslugama i procesima, što može da dovede do novih poslovnih prilika i izvora prihoda.
- Reputacija i imidž brenda: Banke koje pokazuju posvećenost održivosti unapređuju svoju reputaciju i imidž brenda, privlačeći klijente i investitore koji poštuju odgovorne poslovne prakse.
- Konkurentska prednost: Diferencijacija kroz održivost može doneti bankama konkurentsku prednost na tržištu, jer privlači rastući segment klijenata koji daju prioritet etičkim i održivim praksama.
- Zadovoljstvo i zadržavanje zaposlenih: Posvećenost banaka održivosti može da poboljša radni moral i celokupnu angažovanost zaposlenih, što dovodi do veće stope zadržavanja zaposlenih i pozitivnijeg radnog okruženja.

Održive bankarske prakse, poput zelenog finansiranja, pomažu u usmeravanju sredstava ka ekološki prihvatljivim projektima i inicijativama, doprinoseći zelenijoj i otpornijoj ekonomiji. Banke mogu dati svoj doprinos održivosti uključivanjem ESG faktora u svoje procese upravljanja rizicima i donošenja odluka (Kontić Lj. & Kontić J., 2023). Kako potrošači i investitori sve više očekuju etičnije i održivije poslovne prakse, ESG postaje sve značajniji za banke. Banke se okreću kreiranju novih proizvoda i usluga koji podržavaju održivost i uzimaju u obzir ESG faktore prilikom donošenja odluka o kreditiranju i ulaganju (Petrović Tomić, 2023). Ulaganjem u održive projekte i preduzeća, banke mogu da prošire svoje poslovanje na nova tržišta, privuku ekološki osvešćene klijente i investitore, te poboljšaju vrednost svog brenda i reputaciju. Štaviše, održivo bankarstvo može pomoći u ublažavanju finansijskih rizika povezanih sa ekološkim i društvenim pitanjima, obezbeđujući dugoročnu stabilnost i profitabilnost bankarskog sektora (Akter & Mondal, 2023). Održivo bankarstvo je ključna komponenta globalnog odgovora na klimatske promene. Ono je neophodno za finansiranje prelaska na niskougljeničnu ekonomiju, upravljanje finansijskim rizicima povezanim sa klimatskim promenama i stvaranje održivijeg i otpornijeg finansijskog sistema (De Haas, 2023). Angažovanost bankarskog sektora u održivom razvoju vidljiva je kroz aktivno učešće u raznim inicijativama, projektima, kao i kroz prihvatanje različitih principa poput Principa UN za odgovorno bankarstvo. Ovi principi usmeravaju banke da svoje strategije usklade sa ciljevima održivog razvoja i Pariskim klimatskim sporazumom, ističući odgovorne prakse u oblastima kao što su: procena uticaja na životnu sredinu, odnosi sa klijentima, angažovanost stejkholdera, upravljanje i transparentnost (Sredojević S. & Sredojević D., 2021). Na kraju, održive bankarske prakse su od ključne važnosti za dugoročni prosperitet i stabilnost finansijskog sektora, jer doprinose dobrobiti društva i celokupne životne sredine.

Metodologija istraživanja

Ključna istraživačka pitanja (IP) su:

IP 1: Koje su ključne karakteristike banaka koje se ponašaju na održiv način?

IP 2: Koji su ključni procesi i aktivnosti koji održive i ekološki odgovorne banke čine prepoznatljivim?

IP 3: Koje su ključne karakteristike održivih banaka sa zanemarljivim rejtingom izloženosti ESG rizicima, a koje posluju u Republici Srbiji?

U prvoj fazi ovog istraživanja primenjeno je kabinetsko istraživanje, poznato i kao sekundarno istraživanje, kao metodologija koja podrazumeva prikupljanje i analizu postojećih podataka i izvora informacija kao što

su: akademski časopisi, knjige, zbornici sa konferencija, izveštaji i podaci međunarodnih organizacija, te izveštaji i publikacije kompanija. U drugoj fazi primenjena je studija slučaja kao dubinska analiza odabranih banaka iz Republike Srbije koje imaju zanemarljiv rejting izloženosti ESG riziku prema metodologiji Morningstar Sustainalytics prema kojoj se vrednosti ispod 10 smatraju zanemarljivim rizikom, a vrednosti iznad 40 ozbiljnim rizikom. Sprovođenjem detaljne analize banaka pomoću studije slučaja, ovo istraživanje omogućava dublje razumevanje načina na koji banke pristupaju održivosti i faktora koji imaju ključni uticaj na njihovo održivo ponašanje.

Rejting banaka prema izloženosti ESG rizicima

Istorijski posmatrano, velike globalne kreditne agencije obično nisu uzimale u obzir ESG perspektivu. Međutim, poslednjih godina dolazi do pozitivnih promena, počevši sa pionirskim poduhvatom koji je preduzeo Standard & Poor's - S&P, kao globalna kreditna agencija, kada je 2019. godine uveo ESG kao deo svojih kreditnih procena. Iste godine, Svetska banka je takođe pokrenula svoju ESG bazu podataka za države, dok je Međunarodni monetarni fond kreirao svoju kontrolnu listu indikatora klimatskih promena u aprilu 2021. godine. Pre 2016. godine, prilikom analize kompanija sa intenzivnom emisijom ugljenika, kreditne agencije su se obično fokusirale na druge materijalne uticaje, uključujući finansijske, regulatorne i pravne faktore koji bi mogli da utiču na kreditni profil kompanije. Od 2020. godine, mnoge kreditne agencije razmatraju niz ESG faktora i procenjuju njihov značaj. One procenjuju odgovor kompanija na ESG rizike i ESG događaje i povezuju taj odgovor sa potencijalnim finansijskim pitanjima, bilansom stanja ili tokovima gotovine, kao što je sposobnost ispunjavanja dužničkih obaveza. Ocenjivanje kreditnih agencija se obično zasniva na: analitičkom prosuđivanju (kvantitativnom i kvalitativnom) koristeći sve informacije koje analitičari smatraju materijalnim; i pristupu usmerenom ka budućnosti, sa različitim vremenskim horizontima i izveštajem o relativnoj verovatnoći nastupanja statusa neispunjenja obaveza (tzv. default statusa).

Pored toga, tokom 2018-2019. godine, velike globalne kreditne agencije Moody's i S&P su počele da razvijaju ESG sisteme ocenjivanja. Kreditne agencije procenjuju predvidljivost sposobnosti emitenta hartija od vrednosti da generiše budući novčani tok kako bi ispunio svoje dužničke obaveze. U tu svrhu, one ispituju da li kompanije mogu da prodaju svoju imovinu kako bi pokrile obaveze. Često se analiziraju i nivoi rizika od sudskih sporova, uključujući ekološke sporove, sporove o zapošljavanju i kršenju ljudskih prava. U tom kontekstu, ESG rizik koji dovodi do sudskih sporova, uvek je bio uključen u analizu kreditnih agencija. Na kvantitativnoj strani, analiza kreditnih agencija se fokusira na ukupan rizik stečaja emitenta hartija od vrednosti, kvalitet njegovog bilansa stanja i kako se on poredi sa drugim emitentima. Zbog svoje uloge na globalnim tržištima, velike kreditne agencije transparentno objavljuju svoje metodologije ocenjivanja koje se odnose na ESG pitanja, što omogućava uvid u njihovu ekspertizu u pogledu kreditnog rezultata (skoringa). Pored toga, ESG kreditni rezultat je rezultat procesa ocenjivanja i vrednovanja uticaja ESG faktora na kreditnu sposobnost pojedinačnog klijenta. Na primer, prema Moody's agenciji za kreditni rejting, ESG kreditni rezultat se prati na petostepenoj skali za svaki pojedinačni faktor na sledeći način (Marty, 2023):

1. E-1, S-1, G-1 (Pozitivan rezultat) – odlično pozicionirani klijenti; njihovo odgovorno ESG ponašanje donosi brojne kreditne benefite;
2. E-2, S-2, G-2 (Neutralan do nizak rezultat) – izloženosti prema klijentima koje nisu ocenjene kao materijalno značajne (blago kreditno pozitivni/negativni klijenti, odnosno kreditno neutralni klijenti);
3. E-3, S-3, G-3 (Umereno negativan rezultat) – izloženosti prema klijentima koje nose umereno negativan kreditni rizik;
4. E-4, S-4, G-4 (Visok negativan rezultat) – izloženosti „problematičnih“ klijenata koje nose visok kreditni rizik;

5. E-5, S-5, G-5 (Vrlo visok negativan rezultat) – izloženosti prema klijentima koje nose izuzetno visok kreditni rizik.

Veza između ESG rejtinga i kreditnog rejtinga predstavlja predmet intenzivne debate među investitorima. Zagovornici ukazuju na studiju britanske Barclays banke koja poredi portfolio sa visokim ESG rezultatom u odnosu na portfolio sa niskim ESG rezultatom koristeći dva različita ESG skupa podataka (MSCI i Sustainalytics). Studija se oslanja na podatke iz tri izvora: Bloomberg Barclays Bond Indices za karakteristike i prinose obveznica, zatim MSCI ESG Research i Sustainalytics za ESG rezultate, fokusirajući se na obveznice koje imaju ocene od MSCI i Sustainalytics, pokrivajući oko 90% investicionih korporativnih obveznica sa investicionim rejtingom u SAD i Evropi. Kao zaključak navedene studije, portfolio sa visokim ESG rezultatom uglavnom, ali ne i uvek, nadmašuje portfolio sa niskim ESG rezultatom (Dynkin et al., 2018).

Pored globalnih kreditnih agencija, pojavljuju se i agencije za ocenjivanje koje se isključivo fokusiraju na ESG rejting, kao što je Morningstar Sustainalytics. Morningstar Sustainalytics je vodeća organizacija koja se bavi sveobuhvatnim istraživanjima, ocenama i prikupljanjem podataka o ESG faktorima, namenjenih institucionalnim investitorima i korporacijama. Sa tradicijom od preko tri decenije, ova organizacija je bila pionir inovativnih rešenja koja osnažuju institucionalne investitore širom sveta da identifikuju, procene i ublaže rizike povezane sa ESG temom i iskoriste nove mogućnosti. Integracija Sustainalytics-a u Morningstar dodatno je pojačala misiju organizacije da investitorima u različite klase imovine obezbedi praktične ESG podatke i pokazatelje na nivou kompanije i fonda. Odeljenje za korporativna rešenja Sustainalytics-a sarađuje sa širokom mrežom kompanija i finansijskih posrednika, olakšavajući integraciju održivosti u njihove politike, operativne prakse i inicijative za ulaganje kapitala (Morningstar, 2023).

Podaci koji se odnose na rejting banaka prema izloženosti ESG rizicima objavljeni od strane Morningstar Sustainalytics su prikazani u Tabeli 2. Podaci su prikupljeni 5. jula 2024. godine na sajtu <https://www.sustainalytics.com/esg-ratings> sa filterima „Filter po sektoru“ – izborom stavke „Banke“ i „Filter po rejtingu“ – izborom stavke „Zanemarljiv rizik“. Vrednosti rejtinga banaka prema izloženosti ESG rizicima kreću se od 0 do 40+. Vrednosti od 0 do 10 se smatraju zanemarljivim rizikom, vrednosti od 10 do 20 se smatraju niskim rizikom, vrednosti od 20 do 30 se smatraju srednjim rizikom, vrednosti od 30 do 40 visokim rizikom, dok se vrednosti preko 40 smatraju ozbiljnim rizikom.

Tabela 2 - Rejting banaka prema izloženosti ESG rizicima – prikaz po zemlji/regionu

Banka	Zemlja/region	ESG rejting rizika
European Investment Bank	Luksemburg	4,3
Cassa Depositi e Prestiti SpA	Italija	4,5
Oesterreichische Kontrollbank AG	Austrija	4,9
EUROFIMA European Co for Financing of Railroad Rolling Stock	Švajcarska	5,0
KfW	Nemačka	5,5
Nederlandse Financierings-Maatschappij Ontwikkelingslanden NV	Holandija	5,5

Banka	Zemlja/region	ESG rejting rizika
Council of Europe Development Bank	Francuska	5,6
Berlin Hyp AG	Nemačka	5,9
ABANCA Corporación Bancaria SA-	Španija	6,4
Nordic Investment Bank	Finska	6,5
O-Bank Co. Ltd.	Tajvan	6,6
European Bank for Reconstruction & Development	Velika Britanija	6,9
Türkiye Sinai Kalkinma Bankasi AS	Turska	7,0
Inter-American Development Bank	Sjedinjene Američke Države	7,2
Kuntarahoitus Oyj	Finska	7,2
Swedish Export Credit Corp. ¹	Švedska	7,5
Caisse des Dépôts & Consignations	Francuska	7,7
SFIL SA	Francuska	7,7
International Finance Corp.	Sjedinjene Američke Države	7,8
Asian Development Bank	Filipini	8,2
Landsbankinn hf	Island	8,5
Instituto de Crédito Oficial	Španija	8,6
Inter-American Investment Corp.	Sjedinjene Američke Države	8,6
The Co-operative Bank Plc	Velika Britanija	8,6
Caja Rural de Navarra S. Coop	Španija	8,8
KBC Group NV	Belgija	8,8
Nationwide Building Society	Velika Britanija	8,9
Eurobank Ergasias Services & Holdings SA	Grčka	9,0
NRW.BANK	Nemačka	9,0
Landwirtschaftliche Rentenbank	Nemačka	9,1

Banka	Zemlja/region	ESG rejting rizika
Arion Banki HFICE: ARION	Island	9,2
La Banque Postale SA	Francuska	9,2
BNG Bank NV	Holandija	9,3
Intesa Sanpaolo SpA	Italija	9,3
Nederlandse Waterschapsbank NV	Holandija	9,4
Bayerische Landesbodenkreditanstalt	Nemačka	9,5
Kutxabank SA	Španija	9,6
Sparebanken Sør AS	Norveška	9,7
BNP Paribas Bank Polska SA	Poljska	9,8
The World Bank Group	Sjedinjene Američke Države	9,8
Santander Holdings USA, Inc.	Sjedinjene Američke Države	9,9
Banco de Crédito Social Cooperativo SA	Španija	10,0
Export Development Canada	Kanada	10,0

Izvor: Autor na osnovu podataka prikupljenih sa <https://www.sustainalytics.com/esg-ratings>

Od banaka prikazanih u Tabeli 2, sledeće banke posluju u Republici Srbiji, bilo preko filijala, podružnica, predstavništava ili pružanjem finansijskih usluga:

- Evropska investiciona banka (EIB): EIB je aktivan kreditor u Republici Srbiji koji podržava projekte u oblasti infrastrukture, energetike, životne sredine i razvoja privatnog sektora.
- Evropska banka za obnovu i razvoj (EBRD): EBRD je jedan od glavnih investitora u Republici Srbiji među međunarodnim finansijskim institucijama koji podržava razvoj privatnog sektora i ključnih infrastrukturnih projekata.
- Grupa Svetske banke: Svetska banka posluje u Republici Srbiji preko svojih različitih institucija, pružajući finansijsku i tehničku pomoć za razvojne projekte.
- Eurobank Ergasias Services and Holdings SA Grupa: Eurobanka je grčka bankarska grupa sa značajnim prisustvom u Republici Srbiji već više od dve decenije koja nudi širok spektar bankarskih usluga.
- Intesa Sanpaolo SpA: Intesa Sanpaolo je italijanska bankarska grupa koja ima podružnicu u Republici Srbiji, Banca Intesa Beograd, banku sa najvećim tržišnim udelom (15,38% na kraju marta 2024. godine) posmatrano prema bilansnoj aktivni (Narodna banka Srbije, 2024).
- KfW: KfW je nemačka državna razvojna banka koja je aktivna u Republici Srbiji i koja obezbeđuje kredite i namenska sredstva za finansiranje različitih projekata.

Preostale banke iz Tabele 2, prema dostupnim informacijama iz zvaničnih izvora i sa Internet prezentacija banaka, ne obavljaju direktno poslovanje u Republici Srbiji. Ipak, postoji mogućnost da pojedine banke imaju indirektnu izloženost prema Republici Srbiji kroz investicije ili druge finansijske transakcije. Važno je napomenuti da su ove informacije prikupljane zaključno sa 5. julom 2024. godine, a da prisustvo banaka na različitim tržištima može da varira tokom vremena.

Iako je Grupa Svetske banke prisutna u Republici Srbiji, ona nije komercijalna banka. To je međunarodna finansijska institucija usmerena na pružanje finansijske i tehničke pomoći zemljama u razvoju. Ostale gorepomenute banke, Evropska investiciona banka (EIB), KfW i Evropska banka za obnovu i razvoj (EBRD), nisu komercijalne banke u tradicionalnom smislu. To su razvojne ili investicione banke koje se fokusiraju na finansiranje određenih sektora ili projekata, ne pružajući svakodnevne bankarske usluge pojedincima i preduzećima. Dalja analiza u ovom radu je zasnovana na poslovnim bankama koje preko svojih podružnica posluju u Republici Srbiji:

- Eurobank Ergasias Services and Holdings SA: Eurobank Direktna a.d. Beograd je podružnica Eurobank Ergasias.
- Intesa Sanpaolo SpA: Banca Intesa Beograd je podružnica Intesa Sanpaolo.

Studija slučaja: Pristupi održivosti banaka Eurobank Ergasias Services and Holdings SA i Intesa Sanpaolo SpA

Strategija održivosti Eurobanke obuhvata ciljeve vezane za ekološku održivost, društvenu odgovornost i održivo upravljanje. Banka ima za cilj da preuzme vodeću ulogu u podršci prilikom prelaska na održiviju ekonomiju, kako kroz sopstveno poslovanje, tako i kroz finansiranje i podršku klijenata u njihovim naporima ka postizanju održivosti. U Tabeli 3 su prikazani ključni ciljevi strategije održivosti Eurobanke.

Tabela 3 - Ključni ciljevi strategije održivosti Eurobanke

Cilj	Kategorija	Specifični ciljevi
Sveobuhvatna vizija	Transformacija	Postati održiva banka
		Postići otpornost na buduće promene u okruženju i društvu
		Pružiti veću vrednost društvenoj zajednici
	Dugoročni prosperitet	Finansirati održivi razvoj
		Pružiti vrednost ljudima, zainteresovanim stranama i društvu
		Stvoriti pozitivne ekonomske, društvene i ekološke uticaje

Cilj	Kategorija	Specifični ciljevi
Operativna strategija	Pozitivan uticaj na životnu sredinu	Postići operativnu neto nultu emisiju štetnih gasova
		Promovisati orijentaciju ka digitalnim dokumentima (bez papira)
		Prihvatiti principe cirkularne ekonomije
	Uticaj iz ugla poslodavca	Negovati različitost, jednakost i inkluziju
		Promovisati dobrobit zaposlenih
		Stvoriti inovativno radno okruženje
	Društveni i poslovni uticaj	Osigurati održivu nabavku
		Maksimizirati društveno-ekonomski učinak
		Osigurati transparentnost i izgraditi ESG kapacitete
Finansijska strategija	Finansiranje i podrška	Finansirati i podržavati klijente u njihovoj tranziciji ka održivijoj i cirkularnoj ekonomiji
Dodatni ciljevi	Usklađenost sa međunarodnom regulativom	Uskladiti aktivnosti sa Pariskim sporazumom, akcionim planom EU za održivo finansiranje i ciljevima održivog razvoja Ujedinjenih nacija
	Podizanje svesti i edukacija	Pokrenuti inicijative za podizanje svesti klijenata o održivim aktivnostima
		Obezbediti ESG obuku za zaposlene
	Poboljšanje proizvoda i usluga	Uvesti nove proizvode i usluge koji promovišu održivi razvoj
	Upravljanje rizicima	Unaprediti politike upravljanja ekološkim i društvenim rizicima
		Ojačati evaluaciju održivog ponašanja dobavljača i prakse održivog finansiranja

Izvor: prilagođeno prema Eurobank Holdings (n.d.) *Our ESG strategy for a strong economic, social and environmental impact*, dostupno na: <https://www.eurobankholdings.gr/en/esg-environment-society-governance>

Eurobanka nudi raznovrsne ekološki prihvatljive proizvode i usluge, kao što su biorazgradive debitne kartice, WWF Visa kartice, zeleni stambeni krediti, krediti za ulaganja u obnovljive izvore energije i elektronski izvodi. Eurobanka podiže svest o značaju održivosti među svojim stejkholderima deljenjem informacija o svojim ekološkim inicijativama i podsticanjem učešća u srodnim volonterskim aktivnostima (Eurobank Holdings (n.d.) - ESG Ratings and Performance). U Tabeli 4 su prikazane ključne prednosti strategije održivosti Eurobanke.

Tabela 4 - Ključne prednosti strategije održivosti Eurobanke

Ključne prednosti	Opis
Unapređeno upravljanje rizicima	Eurobanka proaktivno identifikuje i ublažava potencijalne finansijske i reputacione rizike povezane sa ekološkim, društvenim i upravljačkim faktorima. Ovo vodi ka većoj dugoročnoj stabilnosti i otpornosti.
Poboljšana reputacija i imidž brenda	Posvećenost Eurobanke održivosti jača njen brend, privlačeći klijente i investitore koji posebno cene ESG kriterijume. Na taj način, Eurobanka se diferencira na tržištu.
Povećan pristup kapitalu	Fokus na održivosti privlači investitore koji traže ulaganja usklađena sa ESG standardima, otvarajući nove mogućnosti finansiranja za banku.
Privlačenje i zadržavanje talentovanih zaposlenih	Snažna strategija održivosti privlači sve veći broj profesionalaca koji daju prednost radu sa svrhom i društvenom odgovornošću, pomažući u privlačenju i zadržavanju talenata.
Pozitivan društveni i ekološki uticaj	Inicijative Eurobanke doprinose zdravijoj životnoj sredini, jačim zajednicama i pravednijem društvu, usklađujući se sa globalnim ciljevima održivosti.

Izvor: prilagođeno prema Eurobank (2024). Sustainability Policy Framework, dostupno na: <https://www.eurobank.gr/-/media/eurobank/omilos/esg/esg-environment-society-governance/pdf/sustainability-policy-framework.pdf>

U pogledu Intesa Sanpaolo, važno je napomenuti da ova banka stavlja snažan naglasak na održivost kao deo svoje poslovne strategije. Njen sveobuhvatan pristup usklađen je sa međunarodnim standardima i okvirima, s ciljem stvaranja dugoročne vrednosti za sve stakeholdere, istovremeno rešavajući i ekološke i društvene izazove. Intesa Sanpaolo potvrđuje svoju posvećenost sveobuhvatnom ESG izveštavanju kroz usklađivanje sa različitim međunarodnim izveštajnim standardima i okvirima poput: Globalne inicijative za izveštavanje (GRI standardi), Radne Grupe za finansijsko obelodanjivanje povezano sa klimom (TCFD), Odbora za standarde održivosti u računovodstvu (SASB) i metrika Svetskog ekonomskog foruma (engl. Stakeholder Capitalism Metrics). Dodatno, Intesa Sanpaolo se u svojim izveštajima poziva na druge relevantne okvire i inicijative, kao što su: Ciljevi održivog razvoja UN i Globalni dogovor UN. Navedeno oslikava posvećenost banke u procesu usklađivanja ESG strategije sa širokim spektrom održivih ciljeva (Intesa Sanpaolo (n.d.) - Sustainability Reporting). Ključni ciljevi u pogledu održivosti Intesa Sanpaolo prikazani su u Tabeli 5.

Tabela 5 -Ključni ciljevi banke Intesa Sanpaolo u pogledu održivosti

Ključni ciljevi	Opis
Integriranje ESG faktora	Uključivanje ekoloških, društvenih i upravljačkih razmatranja u sve poslovne odluke, uključujući kreditne i investicione prakse.
Podržavanje prelaska na niskougljenu ekonomiju	Finansiranje projekata obnovljive energije, energetske efikasnosti i cirkularne ekonomije kako bi se smanjio ugljeni otisak i doprinelo globalnim klimatskim ciljevima.
Promoviranje društvene inkluzije i jednakosti	Obezbeđivanje pristupa finansijskim uslugama za nedovoljno razvijene zajednice, podrška socijalnim preduzećima i negovanje različitosti i inkluzije.
Poboljšanje transparentnosti i angažovanosti zainteresovanih strana	Izveštavanje o učinku održivosti, angažovanje zainteresovanih strana radi identifikovanja i rešavanja problema, i saradnja sa različitim organizacijama radi promoviranja održivih praksi.
Podsticanje inovacija za održiva rešenja	Podsticanje inovacija u održivom finansiranju i tehnologiji radi razvoja novih proizvoda i usluga koji se bave ekološkim i društvenim izazovima.

Izvor: prilagođeno prema <https://group.intesasanpaolo.com/en/sustainability>

Pristup održivosti Intesa Sanpaolo vodi se sveobuhvatnim planom održivosti koji definiše specifične ciljeve i akcije za svaki od ključnih ciljeva. Posvećenost banke ka postizanju i negovanju održivosti je vidljiva u različitim inicijativama, kao što su: program zelenih obveznica, fondovi za ulaganja sa pozitivnim uticajem na zaštitu životne sredine i podrška socijalnim preduzećima. U Tabeli 6 su prikazane ključne prednosti koje održivi pristup banke Intesa Sanpaolo ima na različite stejkholdere.

Tabela 6 - Prednosti koje pristup održivosti banke Intesa Sanpaolo ima na različite stejkholdere

Stejkholder	Ključne prednosti	Primeri
Banka	Unapređeno upravljanje rizicima	Integriranje ESG faktora u modele procene rizika
	Poboljšana reputacija i imidž brenda	Priznanje leaderske pozicije u održivom finansiranju
	Povećan pristup kapitalu	Izdavanje zelenih obveznica i privlačenje ESG investitora
	Inovacije i konkurentska prednost	Razvoj održivih finansijskih proizvoda i usluga
	Privlačenje i zadržavanje talenata	Stvaranje radnog mesta koje je vođeno svrhom za zaposlene

Stejkholder	Ključne prednosti	Primeri
Klijenti	Pristup održivim finansijskim proizvodima i uslugama	Zeleni krediti, fondovi za ulaganja sa pozitivnim uticajem na životnu sredinu
	Pozitivan društveni i ekološki uticaj	Ulaganje u projekte koji imaju korist za zajednice i životnu sredinu
Investitori	Stvaranje dugoročne vrednosti	Ulaganje u kompaniju sa značajnim rezultatima u oblasti održivosti
	Odgovorno upravljanje rizicima	Ublažavanje finansijskih rizika povezanih sa ESG faktorima
	Transparentnost u ESG izveštavanju	Pristup sveobuhvatnim izveštajima o održivosti
Zaposleni	Radno okruženje vođeno svrhom	Doprinos pozitivnim društvenim i ekološkim promenama
	Mogućnosti za profesionalni razvoj	Programi obuke o održivom finansiranju i ESG temama
Lokalne zajednice	Ekonomski razvoj i društvena inkluzija	Finansiranje pristupačnog stanovanja i društvenih preduzeća
	Očuvanje životne sredine	Ulaganje u obnovljivu energiju i zelenu infrastrukturu
Društvo	Zaštita životne sredine	Smanjenje emisije ugljenika i promovisanje održivih praksi
	Društveni napredak	Rešavanje društvenih nejednakosti i promovisanje finansijske inkluzije
	Održivi razvoj	Doprinos ciljevima održivog razvoja Ujedinjenih nacija

Izvor: prilagođeno prema <https://group.intesasanpaolo.com/en/sustainability>

Sveukupno, održivi pristup banke Intesa Sanpaolo stvara širok spektar koristi za različite stejkholdere, doprinoseći otpornijem finansijskom sistemu, zdravijoj planeti i pravednijem društvu. Primenom navedenih aktivnosti, banka poboljšava svoj imidž, što joj omogućava da privuče nove investitore i proširi pristup kapitalu, uključujući izdavanje zelenih obveznica. Inovacije u oblasti održivih finansijskih proizvoda omogućavaju banci da se istakne na tržištu, dok pristup održivim praksama olakšava privlačenje i zadržavanje talenata. Pored toga, održivi finansijski proizvodi koje banka nudi omogućavaju klijentima da donose odgovorne finansijske odluke koje pozitivno utiču na životnu sredinu.

Diskusija dobijenih rezultata

Studija slučaja bankarskih grupa Eurobanke i Intesa Sanpaolo otkriva njihovu zajedničku posvećenost integraciji ESG principa u strategije i načine poslovanja. Obe banke prepoznaju važnost finansiranja prelaska na niskougljeničnu ekonomiju, pri čemu se Eurobanka fokusira na obnovljivu energiju i energetske efikasnost, dok Intesa Sanpaolo može da se pohvali širim spektrom proizvoda održivog finansiranja. Obe banke su transparentne u svom izveštavanju, iako pridržavanje Intesa Sanpaolo međunarodnim standardima pruža sveobuhvatniji pregled njenih rezultata u oblasti održivosti. Obe banke doprinose održivom finansijskom sektoru kroz svoje pristupe. Njihova posvećenost ESG principima ne samo da ublažava rizike i poboljšava reputaciju, već stvara pozitivne društvene i ekološke uticaje. Finansijski sektor nastavlja da se intenzivno razvija usled rastuće zabrinutosti za životnu sredinu i društvo, te sve inicijative koje su preduzele Eurobanka

i Intesa Sanpaolo služe kao vredni primeri i putokaz za druge institucije koje žele da integrišu održivost u svoje poslovne strategije.

Vlade i međunarodna tela u sve većoj meri primenjuju strože ekološke i društvene propise, zahtevajući od banaka da izveštavaju o svom uticaju na životnu sredinu, kao i o naporima koje čine u oblasti društvene odgovornosti. Ovaj regulatorni pritisak je očigledan u Akcionom planu za održivo finansiranje Evropske unije i sve većem broju obaveznih ESG izveštaja. I Eurobanka i Intesa Sanpaolo proaktivno usklađuju svoje strategije sa ovim regulatornim zahtevima, pokazujući svoju posvećenost transparentnosti i usklađenosti. Integrisanje održivosti u bankarsko poslovanje nije samo moralni imperativ, već i strateška poslovna odluka. Ekološki i društveni rizici, poput klimatskih promena, mogu značajno da utiču na finansijske rezultate banaka. Uključivanjem ESG faktora u svoje okvire za upravljanje rizicima, banke mogu da identifikuju i ublaže potencijalne rizike, osiguravajući dugoročnu stabilnost i profitabilnost. Kao primer ove strateške promene upravo može da posluži fokus Eurobanke na integraciji ESG u upravljanju rizicima i sveobuhvatan pristup Intesa Sanpaolo ka održivosti i održivom poslovanju.

Kako sve više raste potražnja za održivim finansiranjem, banke koje su se etablirale kao lideri u ovoj oblasti mogu da steknu konkurentsku prednost. One mogu da privuku i zadrže vrhunske talente, pristupe novim tržištima i obezbede finansiranje od investitora koji se fokusiraju na održivo poslovanje i pozitivan društveni uticaj. Proaktivne inicijative za održivost koje su zastupljene u Eurobanci i Intesa Sanpaolo pozicioniraju ove banke kao lidere u održivom bankarstvu, omogućavajući im da se diferenciraju na tržištu.

Iako obe banke ostvaruju značajan napredak ka održivosti, postoji prostor za dalji napredak. Eurobanka bi mogla da razmotri proširenje integracije ESG i izvan upravljanja rizicima, ali i proširenje svoje ponude održivog finansiranja. Intesa Sanpaolo, iako već lider u mnogim aspektima, mogla bi da razmotri načine kako da iskoristi svoju ekspertizu da podstakne inovacije u rešenjima održivog finansiranja i poslovanja.

Zaključak

Održivo bankarstvo postaje sve značajnije zbog uloge koju finansijski sektor ima u podsticanju održivog razvoja. Kao posrednici, banke imaju sposobnost da utiču na ponašanje vlada, korporacija i pojedinaca, pa čak i da katalizuju strukturne promene unutar društva. Alociranjem kapitala ka ekološki osvešćenim i održivim investicijama, banke mogu aktivno da doprinesu očuvanju životne sredine, smanjenju siromaštva, finansijskoj inkluziji i opštem blagostanju društva. Štaviše, usvajanje održivih bankarskih praksi može da poboljša reputaciju banke, privuče nove klijente i potencijalno poboljša finansijske rezultate.

Održivo poslovanje je od suštinskog značaja za podsticanje pozitivnih promena unutar bankarskog sektora i šire. Istraživanjem višestrukih faktora održivosti i organizacionog ponašanja, istraživači mogu bankama da pruže konkretno znanje i alate potrebne za snalaženje u kompleksnom finansijskom okruženju, kako bi i bankarski sektor aktivno doprinosio održivijoj i pravednijoj budućnosti za sve zainteresovane strane. Rastući fokus na održivost u bankarstvu je trend koji je podstaknut regulatornim pritiskom, promenljivim preferencijama potrošača i investitora, strategijama ublažavanja rizika, reputacionim koristima i težnjom ka konkurentskoj prednosti. Poslovanje banaka Eurobank i Intesa Sanpaolo ilustruju ovu promenu, pokazujući rastući značaj održivosti u bankarskom sektoru i njen potencijal da oblikuje budućnost finansijskog sistema.

Ovo istraživanje doprinosi teorijskom razumevanju održivosti i organizacionog ponašanja u bankarskom sektoru naglašavajući evolutivnu prirodu održivog organizacionog ponašanja i savremene pristupe koje primenjuju različite banke.

Ono proširuje postojeću literaturu o održivom bankarstvu pružajući uporednu analizu dve istaknute evropske bankarske grupacije, Eurobank i Intesa Sanpaolo, i identifikujući njihove različite strategije, snage i oblasti za unapređenje. Zaključci ovog istraživanja mogu da posluže kao vodič bankama u razvoju i unapređivanju njihovih strategija održivosti. Razumevanjem različitih pristupa i njihovih ključnih koristi, banke mogu da identifikuju oblasti za unapređenje i da implementiraju najbolje prakse kako bi poboljšale svoje pristupe ka održivosti. Na kraju, praktične koristi ovog istraživanja mogu da se reflektuju i na društvo u celini. Promovisanjem održivih bankarskih praksi, banke mogu da doprinesu održivijem i pravednijem finansijskom sistemu koji podržava zaštitu životne sredine, društveno blagostanje i dugoročni ekonomski prosperitet.

Ograničenje ovog rada leži u njegovom obuhvatu. Istraživanjem su obuhvaćene samo dve banke, Eurobank i Intesa Sanpaolo. Iako su ove banke značajni akteri u evropskom bankarskom sektoru, njihova iskustva i strategije možda nisu u potpunosti reprezentativne za ceo bankarski sektor. Dodatno, istraživanje se oslanja na javno dostupne informacije i podatke koje su same banke objavile, što može da bude podložno pristrasnoj oceni i dozi subjektivnosti.

Predlog za buduća istraživanja na ovu temu je da se sprovede sveobuhvatnija studija koja bi obuhvatila veći uzorak banaka iz različitih geografskih regiona kako bi se pružilo detaljnije razumevanje izazova i mogućnosti povezanih sa održivim bankarskim praksama. Takođe, imajući u vidu činjenicu da se ovaj rad prvenstveno oslanja na kabinetsko istraživanje dostupnih podataka i informacija, bilo bi korisno da buduća istraživanja obuhvate i druge istraživačke tehnike, kao što su intervjui sa rukovodiocima i zaposlenima u bankama, kako bi se dobila saznanja vezana za motivaciju, izazove i uočene koristi od primene održivih praksi. Na kraju, bilo bi korisno sprovesti longitudinalno istraživanje kako bi se pratilo razvijanje održivih bankarskih praksi tokom vremena i procenio njihov dugoročni uticaj na finansijske performanse, upravljanje rizicima i odnose sa stejkholderima.

Reference

1. Akter, N., & Mondal, M. S. A. (2023). Sustainable banking practices and their development: A study on banks operating in Bangladesh. *Journal of Business and Development Studies*, 2(1), 67–87.
2. Aracil, E., Nájera-Sánchez, J., & Forcadell, F. J. (2021). Sustainable banking: A literature review and integrative framework. *Finance Research Letters*, 42, 101932. <https://doi.org/10.1016/j.frl.2021.101932>
3. Azizzadeh, F., Islam, M. S., Naushin, N., Zupok, S., Soboń, D., Soboń, J., Selezneva, R., & Jada, H. M. (2022). Modeling employees' skills for sustainable banking services. *Frontiers in Sociology*, 7, 985158. <https://doi.org/10.3389/fsoc.2022.985158>
4. De Haas, R. (2023). Sustainable Banking. EBRD Working Paper No. 282, dostupno na SSRN: <https://ssrn.com/abstract=4620166> or <http://dx.doi.org/10.2139/ssrn.4620166>
5. Dynkin, L., Desclee, A., Dubois M., Hyman, J., & Polbennikov, S. (2018). The case for sustainable bond investing strengthens. Barclays Bank PLS.
6. Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11), 2835–2857.
7. Eurobank Holdings (n.d.) Our ESG strategy for a strong economic, social and environmental impact, dostupno na: <https://www.eurobankholdings.gr/en/esg-environment-society-governance>
8. Eurobank Holdings (n.d.) ESG Ratings and Performance, dostupno na: <https://www.eurobankholdings.gr/en/esg-environment-society-governance/esg-aksiologiseis-epidoseis>
9. Eurobank (2024). Sustainability Policy Framework, dostupno na: <https://www.eurobank.gr/-/media/eurobank/omilos/esg/esg-environment-society-governance/pdf/sustainability-policy-framework.pdf>

10. Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233. <https://doi.org/10.1080/20430795.2015.1118917>
11. Goetsch, D. L., & Davis, S. B. (2014). *Quality management for organizational excellence: Introduction to Total Quality*. Upper Saddle River, NJ: Pearson.
12. Intesa Sanpaolo (n.d.). Sustainability Reporting, dostupno na: <https://group.intesasanpaolo.com/en/sustainability/sustainability-reporting>
13. Jeucken, M. (2001). *Sustainable finance and banking: The financial sector and the future of the planet*. London: Routledge. <https://doi.org/10.4324/9781849776264>
14. Kontić, Lj., & Kontić, J. (2023). Strategic aspects of sustainability and digital transformation: A study in an international bank. *Bankarstvo*, 52(1), 48-73. <https://doi.org/10.5937/bankarstvo2301061K>
15. Marty, D. (2023). Rating Methodology. General Principles for Assessing Environmental, Social and Governance Risks. Cross-Sector Rating Methodology, Report Number: 1355824, Moody's Investors Service.
16. Morningstar (2023). Corporate Sustainability Report 2023, dostupno na: <https://www.morningstar.com/company/corporate-sustainability>
17. Narodna banka Srbije (2024). Financial statements of banks, dostupno na: https://www.nbs.rs/sr_RS/finansijske-institucije/banke/bilans-stanja/
18. Nosratabadi, S., Pinter, G., Mosavi, A., & Semperger, S. (2020). Sustainable banking: Evaluation of the European business models. *Sustainability*, 12(6), 2314. <https://doi.org/10.3390/su12062314>
19. Petrović Tomić, N. (2023). Sustainable Business – Are ESG Standards Powering the Resilience of a New Business Model? *Bankarstvo*, 52(2/3), 202-221. DOI: 10.5937/bankarstvo2303202P
20. Ramnarain, T. D., & Pillay, M. T. (2016). Designing sustainable banking services: The case of Mauritian banks. *Procedia - Social and Behavioral Sciences*, 224, 483-490. <https://doi.org/10.1016/j.sbspro.2016.05.424>
21. Rebai, S., Naceur Azaiez, M., & Saidane, D. (2016). A multi-attribute utility model for generating a sustainability index in the banking sector. *Journal of Cleaner Production*, 113: 835-849. <http://dx.doi.org/10.1016/j.jclepro.2015.10.129>
22. Riegler, M. (2023). Towards a definition of sustainable banking - a consolidated approach in the context of guidelines and strategies. *International Journal of Corporate Social Responsibility*, 8(5). <https://doi.org/10.1186/s40991-023-00078-4>
23. Saxena, D., Dhall, N., & Malik, R. (2021). Sustainable banking: A roadmap to sustainable development. *Corporate Governance and Sustainability Review*, 5(3), 42-56. <https://doi.org/10.22495/cgs-rv5i3p4>
24. Schaltegger, S., & Wagner, M. (Eds.). (2006). *Managing the business case of sustainability*. Sheffield: Greenleaf.
25. Schaltegger, S., & Lüdeke-Freund, F. (2012). The "Business Case for Sustainability" Concept: A Short Introduction (CSM Lüneburg Discussion Paper No. 22). Leuphana Universität Lüneburg. <https://ssrn.com/abstract=2094238>
26. Schaltegger, S., Lüdeke-Freund, F., & Hansen, E.G. (2012). Business cases for sustainability: The role of business model innovation for corporate sustainability. *International Journal of Innovation and Sustainable Development*, 6(2), 95-119. DOI: 10.1504/IJISD.2012.046944
27. Sredojević, S., & Sredojević, D. (2021). Sustainable finance - evolution or revolution in the banking sector. *Bankarstvo*, 50(2), 114-131. DOI: 10.5937/bankarstvo2102114S
28. <https://group.intesasanpaolo.com/en/sustainability>
29. <https://www.sustainalytics.com/esg-ratings>

DOI: 10.5937/bankarstvo2403224L

SUSTAINABILITY AND ORGANIZATIONAL BEHAVIOR IN THE BANKING SECTOR IN CONTEMPORARY BUSINESS ENVIRONMENT: CASE STUDIES OF SUSTAINABLE BANKS

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Summary: This paper examines sustainability and organizational behavior in the banking sector, focusing on the key features, processes, and actions that distinguish sustainable banks. It emphasizes their role in environmental responsibility and creating long-term value. Utilizing both desk research and case studies of banks with negligible environmental, social, and governance (ESG) risk ratings, the paper reveals that these banks prioritize ESG factors in their operations. This commitment is evident in their practices of responsible lending, green financing, and social impact initiatives. Case studies of Eurobank and Intesa Sanpaolo banking groups which operate in the Republic of Serbia and have negligible ESG risk rating illustrate successful implementations of sustainable banking practices, highlighting their positive effects on risk management, reputation, and sustained profitability. Sustainable banking and organizational behavior are becoming increasingly important in shaping a resilient financial sector and creating a sustainable future.

Keywords: sustainability, organizational behavior, contemporary business, case study, sustainable banks, ESG rating

JEL classification: Q56, M14, G21

Introduction

Organizational sustainability is an emerging topic that examines how organizations can integrate environmental, social, and economic considerations into their practices, operations, and decision-making processes (Schaltegger & Wagner, 2006). Schaltegger and Lüdeke-Freund (2012) defined a business approach to sustainability as the intentional and successful pursuit of economic gains through the thoughtful design of voluntary environmental and social management practices. This concept diverges from a traditional business approach, as it is not solely driven by profit maximization but also by a commitment to address social and environmental challenges. These actions go beyond mere compliance with legal regulations and extend beyond actions that would be taken solely for economic reasons. However, it is important to acknowledge that the activities undertaken should generate a measurable or convincingly arguable positive impact on the company's economic success. Schaltegger et al. (2012) explain that corporate sustainability strategies are crucial for companies to successfully navigate social, legal, political, and economic demands while remaining competitive. The authors identify several business case drivers that can influence the economic success of responsible and sustainability initiatives. These drivers include reduced cost and increased efficiency, reduced risk of fines, lower externalities, sales and profit margin, reputation and brand value, attractiveness as an employer, and innovative capabilities. The impact of each driver can vary depending on the specific sustainability activities implemented by the company. Organizational sustainability encompasses actions, practices, and decisions that minimize negative impacts and maximize positive impacts on the environment, society, and the economy. It involves balancing short-term gains with long-term performances (Goetsch & Davis, 2014). While initially focused on manufacturing and resource-intensive industries, organizational sustainability has gained prominence in the service industry, particularly in banking.

In the banking sector, sustainable behavior refers to integrating environmental, social, and governance (ESG) factors into banking operations. This includes responsible lending practices, investing in sustainable projects, reducing the environmental footprint of operations, and promoting financial inclusion. Among various initiatives, banks and the banking sector play a significant role toward the realization of very ambitious objectives framed by a widely accepted concept of net zero greenhouse gas emissions, as well as turning the European continent into the first climate-neutral continent by 2050. Sustainable banking is an evolving concept that has gained prominence due to the increasing global awareness of environmental, social, and financial concerns. The core idea of sustainable banking is to balance the needs of the current generation without compromising the ability of future generations to meet their own needs (Riegler, 2023).

The aim of this paper is to examine and analyze the key characteristics of banks which behave in a sustainable way, and to point out the key processes and activities that make these banks recognizable as sustainable and environmentally responsible. The significance of sustainability in the banking sector cannot be overstated. As Eccles et al. (2014) highlight, financial institutions play a pivotal role in shaping economies and societies, and their operational practices have a profound ripple effect on various stakeholders. By delving into the realm of sustainability and organizational behavior, researchers can unlock valuable insights and strategies that drive positive change within the banking sector, as evidenced by over 2000 empirical studies analyzed in the paper by Friede et al. (2015).

Sustainable Banking – Definitions and Key Benefits

Sustainable banking can be defined as a reliable banking system that considers the needs of all stakeholders, including both those within and outside the organization, and balances financial and non-financial factors. It prioritizes social and environmental considerations in its activities, focusing on both short-term and long-term impacts. By upholding ethical values and effectively managing various risks, sustainable banking contributes to the overall stability and resilience of the financial system while striving to balance the interests of all involved parties (Rebai et al., 2016).

The banking sector plays a crucial role in sustainable development due to its intermediary role in the economy (Aracil et al., 2021). Banks can influence other industries and contribute to achieving sustainable development goals by participating in environmental projects, directing funds based on environmental risks, and promoting socially responsible products and services (Riegler, 2023). Sustainable banks are referred to by a variety of names in the literature, including green banks, ethical banks, corporate socially responsible banks, and eco-banks (Aracil et al., 2021). Ramnarain and Pillay (2016) explain that sustainable banking is a holistic approach that goes beyond simply being eco-friendly. It involves how banks design, build, and conduct their business for the long term, considering all resources. This includes corporate culture, business innovation, operational excellence, social responsibility, and customer focus, exceeding basic compliance requirements. Sustainable banking, as discussed in Akter and Mondal (2023), is a multifaceted concept that aims to integrate environmental and social considerations into the core operations of financial institutions. It encompasses a range of practices, including green financing, corporate social responsibility, and financial inclusion. Green financing involves directing financial resources toward projects and initiatives that have positive environmental impacts, such as renewable energy, energy efficiency, and waste management. Nosratabadi et al. (2020) suggest that banks can implement sustainability principles through a variety of strategies, including waste management, water and energy consumption management, and employee empowerment. They argue that transitioning to sustainability requires complex processes and can be achieved through innovative services, new service creation and delivery approaches, and new forms of business partnerships. The authors emphasize that sustainable business models are crucial for banks to design sustainable values and gain a comprehensive understanding of their business operations. The importance of sustainable banking is underscored by the urgent need to address climate change and the financial sector's pivotal role in this endeavor. The transition to a low-carbon economy requires significant financial investments in green technologies and infrastructure. Banks, as major providers of capital, can play a crucial role in directing financial flows toward sustainable projects and businesses (De Haas, 2023). The social aspect of sustainable banking emphasizes the bank's relationship with its employees, customers, and the wider community. It involves promoting financial inclusion, supporting social welfare projects, and ensuring fair labor practices (Saxena et al., 2021). Banks should focus on recruiting and retaining those employees who possess the skills necessary for sustainability in the banking sector. Furthermore, banks often provide training programs to fill skill gaps and keep employees motivated. Investment in human capital can improve employee performance and contribute to the bank's overall sustainability. By ensuring that employees have the right skills and are motivated and engaged, banks can enhance their sustainability (Azizzadeh et al., 2022).

The typology of banking and its sustainable development can be explained through different phases that banks typically go through as they integrate sustainability into their operations. This typology was proposed by Jeucken (2001) and is based on the idea that banks progress from a defensive stance toward sustainability to a more proactive and holistic approach. The key phases and their descriptions are presented in Table 1.

Table 1 - The Key Phases of Development of Sustainable Banking

Phase	Description
Defensive Banking	In this initial phase, banks are resistant to environmental considerations, perceiving them as potential threats to their interests. They may actively oppose or disregard sustainability initiatives.
Preventative Banking	At this phase, banks start to recognize the potential cost savings and efficiencies associated with eco-friendly practices. They may adopt some environmental measures, often driven by regulatory requirements or social pressure.
Offensive Banking	Banks in this phase go beyond internal practices and actively seek to promote sustainability through their external activities. They develop and market environmentally friendly products, incorporate social considerations, and look for win-win solutions that benefit both the bank and the environment.
Sustainable Banking	This is the most advanced phase, where sustainability is fully integrated into the bank's core business strategy. Banks aim to be profitable in the long run while contributing to sustainable development.

Source: adapted from Jeucken, M. (2001). Sustainable finance and banking: The financial sector and the future of the planet. London: Routledge. <https://doi.org/10.4324/9781849776264>

This typology is valuable for understanding the evolution of banks' attitudes and actions toward sustainability. It highlights the different phases of integration and the increasing emphasis on environmental and social considerations as banks progress through the phases.

Sustainable banking is important for several reasons (Ramnarain & Pillay, 2016; Nosratabadi et al., 2020):

- Financial performance: Banks that prioritize sustainability often experience better financial performance in terms of valuation, profit/loss, and return on equity. Sustainability initiatives, even though they may require initial investments, can lead to long-term cost reductions and increased profitability. For example, energy and water consumption management can lower operational costs.
- Risk management: Sustainable banking practices help manage environmental and social risks associated with investments and lending activities.
- Stakeholder confidence: By addressing ESG concerns, banks can build trust and confidence among stakeholders, including customers, investors, and regulators.
- Long-term viability: Sustainable banking ensures the long-term viability of the banking sector by considering the impact of financial activities on the environment and society.
- Regulatory compliance: As regulations increasingly focus on sustainability, banks that adopt sustainable practices are better positioned to comply with these requirements.
- Innovation and growth: Sustainable banking can drive innovation and open up new business opportunities in areas such as green financing and social impact investing. The pursuit of sustainability often drives innovation in products, services, and processes, which can lead to new business opportunities and revenue streams.

- Reputation and brand image: Banks that demonstrate a commitment to sustainability enhance their reputation and brand image, attracting customers and investors who value responsible business practices.
- Competitive advantage: Differentiating through sustainability can give banks a competitive edge in the market, as it appeals to a growing segment of customers who prioritize ethical and sustainable practices.
- Employee satisfaction and retention: A commitment to sustainability can improve employee morale and engagement, leading to higher retention rates and a more positive work environment.

Sustainable banking practices, such as green financing, help to channel funds toward environmentally friendly projects and initiatives, contributing to a greener and more resilient economy. Banks can contribute to sustainability by incorporating ESG factors into their risk management and decision-making processes (Kontić Lj. & Kontić J., 2023). As consumers and investors expect more ethical and sustainable business practices, ESG is becoming more and more significant for banks. Banks are creating new products and services that support sustainability and are taking ESG factors into account when making lending and investment choices (Petrović Tomić, 2023). By investing in sustainable projects and businesses, banks can enter into new markets, attract environmentally conscious customers and investors, and enhance their brand value and global recognition. Moreover, sustainable banking can help mitigate financial risks associated with environmental and social issues, ensuring long-term stability and profitability for the banking sector (Akter & Mondal, 2023). Sustainable banking is a critical component of the global response to climate change. It is essential for financing the transition to a low-carbon economy, managing climate-related financial risks, and creating a more sustainable and resilient financial system (De Haas, 2023). The banking sector's involvement in sustainable development is evident through its active participation in various initiatives, projects, and the adoption of principles like the United Nations Principles for Responsible Banking. These principles guide banks in aligning their strategies with sustainable development goals and the Paris Climate Agreement, emphasizing responsible practices in areas such as impact assessment, client relationships, stakeholder engagement, governance, and transparency (Sredojević S. & Sredojević D., 2021). In conclusion, sustainable banking practices are crucial for the enduring prosperity and stability of the financial sector, while simultaneously contributing to the welfare of both society and the entire environment.

Research Methodology

The key research questions (RQ) are:

RQ1: What are the key characteristics of banks that behave in a sustainable way?

RQ2: What are the key processes and activities that make banks recognizable as sustainable and environmentally responsible?

RQ3: What are the key characteristics of sustainable banks with negligible ESG risk rating which actively operates in the Republic of Serbia?

In the first phase of this research desk research was applied, also known as secondary research, as a methodology that involves the collection and analysis of existing data and information sources such as academic journals, books, conference proceedings, international organizations reports and data, and company's reports and publications. In the second phase, a case study was conducted to perform an in-depth analysis of selected banks from the Republic of Serbia with a negligible ESG risk exposure rating.

According to the Morningstar Sustainalytics methodology, a rating below 10 is classified as negligible risk, while a rating above 40 indicates severe risk. By conducting a thorough case study analysis, this research provides a deeper understanding of how banks approach sustainability and the factors that influence their behavior.

ESG Risk Rating Among Banks

Historically observed, ESG analysis was not typically considered by major global credit rating agencies (abbreviated: CRAs). But this has changed in recent years, starting with an evolutionary step which was taken by Standard & Poor's - S&P, as global CRA, when it rolled out ESG as part of its credit assessments in 2019. In the same year, the World Bank also launched its Sovereign ESG database whilst the IMF launched its Climate Change Indicators Dashboard in April 2021. Before 2016, when analyzing a carbon-intense company, CRAs might have typically focused on other material impacts, including financial, regulatory, and legal factors that could affect the company's credit profile. As of 2020, many CRAs look at a range of ESG factors and judge materiality. They judge the company's response to ESG risks and ESG events and link that response to potential financial and balance sheet or cash flow considerations, such as the ability to meet debt obligations. CRA rating is typically based on: analytical judgment (both quantitative and qualitative), using all the information deemed material by the analysts; and forward looking approach, with a varying time horizon with a statement of the relative likelihood of default.

In addition, during 2018–2019, major global CRAs Moody's and S&P developed further ESG evaluation systems, which continue to evolve. Typically, CRAs assess the predictability of an issuer of securities' ability to generate future cash flow to meet its debt obligations. To this end, they look at whether companies can sell their assets to cover obligations. The levels of litigation risk are often analyzed as well, including environmental litigation, employment litigation, and human rights violations. In that sense, ESG risk, which comes to litigation, has always been incorporated into CRA analysis. On the quantitative side, the credit agencies' analysis focuses on the overall bankruptcy risk of the securities issuer, the quality of its balance sheet, and how it compares to other issuers. Due to their role on the global markets, major CRAs transparently published its rating methodologies that are related to ESG issues, which make possible insight into their know-how in terms of credit scoring. Additionally, ESG credit score is the result of the rating process and evaluation of the impact of ESG factors on the creditworthiness of an individual client. For example, according to Moody's rating agency, the ESG credit score is monitored on a five-point scale for each individual factor as follows (Marty, 2023):

1. E-1, S-1, G-1 (Positive score) – excellently positioned clients; their responsible ESG behavior carries credit benefits;
2. E-2, S-2, G-2 (Neutral to low score) – client exposures that are not materially significant (slightly credit positive/negative clients, i.e. credit neutral clients);
3. E-3, S-3, G-3 (Moderately negative score) – client exposures that carry a moderately negative credit risk;
4. E-4, S-4, G-4 (High negative score) – exposures of “problematic” clients that carry a high credit risk;
5. E-5, S-5, G-5 (Very high negative score) – client exposures that carry an extremely high credit risk.

The relationship between ESG ratings and credit ratings is still widely contested among investors. Proponents might point to a Barclays' study looking at a high ESG portfolio versus a low ESG portfolio using two different ESG datasets (MSCI and Sustainalytics). Barclays' study is relied on data from three sources: Bloomberg Barclays Bond Indices for bond characteristics and returns, then MSCI ESG Research and Sustainalytics for ESG scores focusing on bonds that have ratings from both ESG providers i.e. MSCI and Sustainalytics, covering about 90% of the US and European investment grade corporate bonds. As a conclusion of Barclays' study, high ESG portfolio mostly, but not always outperformed a low ESG portfolio (Dynkin et al., 2018).

Apart from global CRA, there is emergence of rating agencies solely focused on ESG scoring, such as Morningstar Sustainalytics. Morningstar Sustainalytics is a leading provider of comprehensive ESG research, ratings, and data services catering to institutional investors and corporations. With a legacy spanning over three decades, the company has consistently pioneered innovative solutions empowering institutional investors globally to identify, assess, and mitigate ESG-related risks and capitalize on emerging opportunities. The integration of Sustainalytics into Morningstar has further amplified the company's mission to furnish investors across diverse asset classes with actionable ESG insights at both company and fund levels. Sustainalytics' Corporate Solutions division collaborates with a vast network of companies and financial intermediaries, facilitating the integration of sustainability considerations into their policies, operational practices, and capital investment initiatives (Morningstar, 2023).

The data regarding the ESG risk rating provided by Morningstar Sustainalytics are presented in Table 2. The data were collected on July 5, 2024 from <https://www.sustainalytics.com/esg-ratings> with filtering „Filter by Industry“ - choosing item „Banks“ and „Filter by Rating“ - choosing item „Negligible Risk“. The values of ESG risk ratings range from 0 to 40+. Values from 0 to 10 are considered as negligible risk, values from 10 to 20 are considered as low risk, values from 20 to 30 are considered as medium risk, values from 30 to 40 as high risk, while values higher than 40 are considered as severe risk.

Table 2 - ESG Risk Rating Among Banks - Breakdown per Country/Region

Bank	Country/Region	ESG Risk Rating
European Investment Bank	Luxembourg	4.3
Cassa Depositi e Prestiti SpA	Italy	4.5
Oesterreichische Kontrollbank AG	Austria	4.9
EUROFIMA European Co for Financing of Railroad Rolling Stock	Switzerland	5.0
KfW	Germany	5.5
Nederlandse Financierings-Maatschappij Ontwikkelingslanden NV	Netherlands	5.5

Bank	Country/Region	ESG Risk Rating
Council of Europe Development Bank	France	5.6
Berlin Hyp AG	Germany	5.9
ABANCA Corporación Bancaria SA-	Spain	6.4
Nordic Investment Bank	Finland	6.5
O-Bank Co. Ltd.	Taiwan	6.6
European Bank for Reconstruction & Development	United Kingdom	6.9
Türkiye Sinai Kalkinma Bankasi AS	Turkey	7.0
Inter-American Development Bank	United States of America	7.2
Kuntarahoitus Oyj	Finland	7.2
Swedish Export Credit Corp.	Sweden	7.5
Caisse des Dépôts & Consignations	France	7.7
SFIL SA	France	7.7
International Finance Corp.	United States of America	7.8
Asian Development Bank	Philippines	8.2
Landsbankinn hf	Iceland	8.5
Instituto de Crédito Oficial	Spain	8.6
Inter-American Investment Corp.	United States of America	8.6
The Co-operative Bank Plc	United Kingdom	8.6
Caja Rural de Navarra S. Coop	Spain	8.8
KBC Group NV	Belgium	8.8
Nationwide Building Society	United Kingdom	8.9
Eurobank Ergasias Services & Holdings SA	Greece	9.0
NRW.BANK	Germany	9.0
Landwirtschaftliche Rentenbank	Germany	9.1

Bank	Country/Region	ESG Risk Rating
Arion Banki HFICE: ARION	Iceland	9.2
La Banque Postale SA	France	9.2
BNG Bank NV	Netherlands	9.3
Intesa Sanpaolo SpA	Italy	9.3
Nederlandse Waterschapsbank NV	Netherlands	9.4
Bayerische Landesbodenkreditanstalt	Germany	9.5
Kutxabank SA	Spain	9.6
Sparebanken Sør AS	Norway	9.7
BNP Paribas Bank Polska SA	Poland	9.8
The World Bank Group	United States of America	9.8
Santander Holdings USA, Inc.	United States of America	9.9
Banco de Crédito Social Cooperativo SA	Spain	10.0
Export Development Canada	Canada	10.0

Source: Author based on data collected from <https://www.sustainalytics.com/esg-ratings>

From the list of banks presented in Table 2, the following banks operate in the Republic of Serbia, either through branches, subsidiaries, representative offices, or by providing financial services:

- European Investment Bank (EIB): The EIB is an active lender in the Republic of Serbia, supporting projects in infrastructure, energy, environment, and private sector development.
- European Bank for Reconstruction and Development (EBRD): The EBRD is a major investor in the Republic of Serbia among the scope of international financial institutions, supporting the development of the private sector and key infrastructure projects.
- The World Bank Group: The World Bank operates in the Republic of Serbia through its various institutions, providing financial and technical assistance for development projects.
- Eurobank Ergasias Services and Holdings SA: Eurobank is a Greek banking group with a significant presence in the Republic of Serbia for over two decades, offering a wide range of banking services.
- Intesa Sanpaolo SpA: Intesa Sanpaolo is an Italian banking group that has a subsidiary bank in the Republic of Serbia, Banca Intesa Beograd, bank with the largest market share (15.38% as at end of March 2024) in terms of balance sheet assets (National bank of Serbia, 2024).

- KfW: KfW Development Bank is a German state-owned development bank that has been active in the Republic of Serbia, providing loans and grants for various projects.

The remaining banks in the Table 2 do not appear to have direct operations in the Republic of Serbia, based on information available from official sources and the banks' websites. However, it is possible that some of them may have indirect exposure to the Republic of Serbia through investments or other financial transactions. It is important to note that this information is current as of July 5, 2024, and the presence of banks in different markets can vary over time.

Although the World Bank Group is present in the Republic of Serbia, it is not a commercial bank. It is an international financial institution focused on providing financial and technical assistance to developing countries. The other banks mentioned above, the European Investment Bank (EIB), KfW, and the European Bank for Reconstruction and Development (EBRD), are not commercial banks in the traditional sense. They are development banks or investment banks that focus on financing specific sectors or projects, rather than providing everyday banking services to individuals and businesses. Further analysis in this paper will be based on commercial banks that actively operate in the banking sector of the Republic of Serbia:

- Eurobank Ergasias Services and Holdings SA: Eurobank Direktna a.d. Beograd is a subsidiary of Eurobank Ergasias; and
- Intesa Sanpaolo SpA: Banca Intesa Beograd is a subsidiary of Intesa Sanpaolo.

Case Study: Sustainability Approach of Eurobank Ergasias Services and Holdings SA and Intesa Sanpaolo SpA

Eurobank's sustainable strategy encompasses goals related to environmental sustainability, social responsibility, and strong governance. The bank aims to play a leading role in supporting the transition to a more sustainable economy, both through its own operations and by financing and supporting its clients in their sustainability efforts. The key goals of Eurobank's sustainable strategy are summarized in Table 3.

Table 3 - The Key Goals of Eurobank's Sustainable Strategy

Strategic goal	Goal category	Specific goals
Overarching vision	Transformation	Become a more sustainable bank at the core
		Be resilient to future environmental and social shifts
		Deliver enhanced social value
	Long-term prosperity	Finance sustainable development
		Deliver value to people, stakeholders, and society
		Create positive economic, social, and environmental impacts

Strategic goal	Goal category	Specific goals
Operational impact strategy	Environmental Impact	Achieve operational net zero
		Promote paperless banking
		Embrace circular economy principles
	Employer impact	Foster diversity, equity, and inclusion
		Promote employee well-being
		Create an innovative work environment
	Social & business impact	Ensure sustainable procurement
		Maximize socio-economic effect
		Ensure transparency and build ESG capacity
Financed impact strategy	Financing & support	Finance and support customers in their transition to a more sustainable and circular economy
Additional goals	International alignment	Align activities with the Paris Agreement, EU Sustainable Finance Action Plan, and United Nations Sustainable Developmental Goals
	Awareness & education	Launch awareness initiatives for clients on sustainable activities
		Provide ESG training for employees
	Product enhancement	Introduce new products and services that promote sustainable development
	Risk management	Enhance policies on client, environmental, and social risk management
		Strengthen supplier evaluation and sustainable financing practices

Source: adapted from Eurobank Holdings (n.d.) *Our ESG strategy for a strong economic, social and environmental impact*, available on: <https://www.eurobankholdings.gr/en/esg-environment-society-governance>

Eurobank offers a variety of environmentally friendly products and services, such as biodegradable debit cards, WWF Visa cards, green mortgage loans, loans for investments in renewable energy sources, and e-statements. Eurobank raises awareness among its stakeholders about the importance of sustainability by sharing information about its environmental initiatives and encouraging them to participate in related volunteering activities (Eurobank Holdings (n.d.) - ESG Ratings and Performance). The key benefits of Eurobank's sustainable strategy are presented in Table 4.

Table 4 - The Key Benefits of Eurobank’s Sustainable Strategy

Key benefits	Description
Enhanced risk management	Eurobank proactively identifies and mitigates potential financial and reputational risks associated with ESG factors. This leads to greater long-term stability and resilience.
Improved reputation and brand image	Eurobank's commitment to sustainability strengthens its brand, attracting customers and investors who value ESG considerations, and differentiating it in the market.
Increased access to capital	The focus on sustainability attracts investors seeking ESG-aligned investments, opening new funding opportunities for the bank.
Attracting and retaining talented employees	A strong sustainability strategy appeals to a growing pool of professionals who prioritize purpose-driven work and social responsibility, aiding in talent acquisition and retention.
Positive social and environmental impact	Eurobank's initiatives contribute to a healthier environment, stronger communities, and a more equitable society, aligning with broader sustainability goals.

Source: adapted from: Eurobank (2024). Sustainability Policy Framework available on: <https://www.eurobank.gr/-/media/eurobank/omilos/esg/esg-environment-society-governance/pdf/sustainability-policy-framework.pdf>

Regarding Intesa Sanpaolo, it is important to acknowledge that this bank and banking Group places a strong emphasis on sustainability as part of its business strategy. Its comprehensive approach aligns with international standards and frameworks, aiming to create long-term value for all stakeholders while addressing environmental and social challenges. Intesa Sanpaolo demonstrates a strong commitment to comprehensive ESG reporting by aligning with multiple international reporting standards and frameworks such as Global Reporting Initiative (GRI) Standards, Task Force on Climate-related Financial Disclosures (TCFD), Sustainability Accounting Standards Board (SASB), and Stakeholder Capitalism Metrics. In addition to these standards, Intesa Sanpaolo also references other relevant frameworks and initiatives, such as the UN Sustainable Development Goals (SDGs) and the UN Global Compact. This reflects its commitment to aligning ESG strategy with broader global sustainability objectives (Intesa Sanpaolo (n.d.) - Sustainability Reporting). The key goals of Intesa Sanpaolo’s sustainability approach are presented in Table 5.

Table 5 - The Key Goals of Intesa Sanpaolo’s Sustainability Approach

Key goals	Description
Integrating ESG factors	Embedding ESG considerations into all business decisions, including lending and investment practices.
Supporting the transition to a low-carbon economy	Financing renewable energy, energy efficiency, and circular economy projects to reduce carbon footprint and contribute to global climate goals.
Promoting social inclusion and equality	Providing access to financial services for underserved communities, supporting social enterprises, and fostering diversity and inclusion within the workforce.
Enhancing transparency and stakeholder engagement	Reporting on sustainability performance, engaging with stakeholders to identify and address concerns, and collaborating with various organizations to promote sustainable practices.
Driving innovation for sustainable solutions	Encouraging innovation in sustainable finance and technology to develop new products and services that address environmental and social challenges.

Source: adapted from <https://group.intesasanpaolo.com/en/sustainability>

Intesa Sanpaolo’s sustainability approach is guided by a comprehensive sustainability plan that outlines specific targets and actions for each of these key goals. The bank’s commitment to sustainability is evident in its various initiatives, such as its green bond program, impact investing funds, and support for social enterprises. Table 6 shows the key benefits that Intesa Sanpaolo’s sustainable approach has on various stakeholders.

Table 6 - Benefits of Intesa Sanpaolo’s Sustainable Approach for Different Stakeholders

Stakeholder	Key benefits	Examples
Company	Enhanced risk management	Integrating ESG factors into risk assessment models
	Improved reputation and brand image	Recognition as a leader in sustainable finance
	Increased access to capital	Issuing green bonds and attracting ESG investors
	Innovation and competitive advantage	Developing sustainable financial products and services
	Attracting and retaining talents	Creating a purpose-driven workplace for employees

Stakeholder	Key benefits	Examples
Customers	Access to sustainable financial products and services	Green loans, impact investing funds
	Positive social and environmental impact	Investing in projects that benefit communities and the environment
Investors	Long-term value creation	Investing in a company with a strong sustainability track record
	Responsible risk management	Mitigating ESG-related financial risks
	Transparency in ESG reporting	Access to comprehensive sustainability reports
Employees	Purpose-driven work environment	Contributing to positive social and environmental change
	Opportunities for professional development	Training programs on sustainable finance and ESG topics
Local communities	Economic development and social inclusion	Financing affordable housing and social enterprises
	Environmental well-being	Investing in renewable energy and green infrastructure
Society	Environmental protection	Reducing carbon emissions and promoting sustainable practices
	Social progress	Addressing social inequalities and promoting financial inclusion
	Sustainable development	Contributing to the United Nations Sustainable Development Goals

Source: Author based on <https://group.intesasanpaolo.com/en/sustainability>

Overall, Intesa Sanpaolo's sustainable approach generates a wide range of benefits for various stakeholders, contributing to a more resilient financial system, a healthier planet, and a more equitable society. By implementing these activities, the bank enhances its image, enabling it to attract new investors and expand access to capital, including the issuance of green bonds. Innovations in sustainable financial products allow the bank to stand out in the market, while the adoption of sustainable practices facilitates the attraction and retention of talent. Furthermore, the sustainable financial products offered by the bank enable clients to make responsible financial decisions that have a positive impact on the environment.

Discussion of Research Findings

The analysis of Eurobank's and Intesa Sanpaolo's sustainability approaches reveals a shared commitment to integrating ESG considerations into their operations. Both banks recognize the importance of financing the transition to a low-carbon economy, with Eurobank focusing on renewable energy and energy efficiency while Intesa Sanpaolo boasts a more extensive range of sustainable finance products.

Analyzed banks are transparent in their reporting, though Intesa Sanpaolo's adherence to international standards provides a more comprehensive overview of its sustainability performance. Both banks contribute to a more sustainable financial sector through their respective approaches. Their commitment to ESG principles not only mitigates risks and enhances their reputation but also creates positive social

and environmental impacts. As the financial sector continues to evolve in response to growing environmental and social concerns, the initiatives undertaken by Eurobank and Intesa Sanpaolo serve as representative valuable examples for other institutions seeking to integrate sustainability into their core business strategies. Governments and international bodies are increasingly implementing environmental and social regulations, requiring banks to disclose their environmental impact and social responsibility efforts. This regulatory push is visible in the European Union's Sustainable Finance Action Plan and the growing number of mandatory ESG disclosures. Both Eurobank and Intesa Sanpaolo are proactively aligning their strategies with these regulatory requirements, demonstrating their commitment to transparency and compliance. Integrating sustainability into banking operations is not just a moral imperative, but also a strategic business decision. Environmental and social risks, such as climate change, can significantly impact a bank's financial performance. By incorporating ESG factors into their risk management frameworks, banks can identify and mitigate potential risks, ensuring long-term stability and profitability. Eurobank's focus on ESG integration in risk management and Intesa Sanpaolo's comprehensive approach to sustainability exemplify this strategic shift.

As the demand for sustainable finance grows, banks that have established themselves as leaders in this area are gaining a competitive advantage. They can attract and retain top talent, access new markets, and secure funding from impact investors. Eurobank and Intesa Sanpaolo's proactive sustainability initiatives position them as leaders in sustainable banking, enabling them to differentiate themselves in the market.

While both banks are making significant strides towards sustainability, there are areas for further improvements. Eurobank could benefit from expanding its ESG integration beyond risk management and broadening its sustainable finance offerings. Intesa Sanpaolo, although already a leader in many aspects, could consider ways to use its expertise to drive innovation in sustainable financing and sustainable business solutions.

Conclusion

Sustainable banking is becoming essential due to the financial sector's pivotal role in fostering sustainable development. As intermediaries within the economy, banks possess the ability to influence the behavior of governments, corporations, and individuals, and can even catalyze structural shifts within society. By allocating capital towards environmentally conscious and sustainable investments, banks can actively contribute to environmental preservation, poverty alleviation, financial inclusivity, and the overall well-being of society. Furthermore, the adoption of sustainable banking practices can improve a bank's reputation, attract a larger customer base, and potentially enhance its financial performance.

Organizational sustainability is of paramount importance for driving positive change within the banking sector and beyond. By exploring the multifaceted dimensions of sustainability and organizational behavior, researchers can provide banks with the knowledge and tools needed to navigate the complexities of the modern financial landscape, ensuring that the sector contributes to a more sustainable and equitable future for all stakeholders. The increasing focus on sustainability in banking is a trend driven by regulatory pressure, changing consumer and investor preferences, risk mitigation strategies, reputational benefits, and the pursuit of competitive advantage. The actions of Eurobank and Intesa Sanpaolo exemplify this shift, demonstrating the growing importance of sustainability in the banking sector and its potential to shape the future of finance.

This research contributes to the theoretical understanding of sustainability and organizational behavior in the banking sector by highlighting the evolving nature of sustainability integration and the diverse

approaches adopted by different banks. It expands the existing literature on sustainable banking by providing a comparative analysis of two prominent European banks, Eurobank and Intesa Sanpaolo, and identifying their distinct strategies, strengths, and areas for improvement. The insights gained from this research can guide banks in developing and refining their sustainability strategies. By understanding the different approaches and their associated benefits, banks can identify areas for improvement and implement best practices to enhance their sustainability performance. Ultimately, the practical benefits of this research can be used in society. By promoting sustainable banking practices, banks can contribute to a more sustainable and equitable financial system that supports environmental protection, social well-being, and long-term economic prosperity.

This paper's primary limitation lies in its narrow focus on only two banks, Eurobank and Intesa Sanpaolo. While these institutions are significant players in the European banking sector, their experiences and strategies may not be fully representative of the broader sectors and industries. Additionally, the paper relies on publicly available information and self-reported data from the banks, which may be subject to biases and subjectivity.

The proposition for future research on this topic is to conduct a more comprehensive study involving a larger sample of banks from diverse geographical regions in order to provide a more nuanced understanding of the challenges and opportunities associated with sustainable banking practices. While this paper primarily relies on secondary data and publicly available information, future research could incorporate other research approaches, such as interviews with bank executives and employees, to gain deeper insights into the motivations, challenges, and perceived benefits of implementing sustainable practices. Finally, it would be beneficial to conduct longitudinal studies to track the evolution of sustainable banking practices over time and assess their long-term impact on financial performance, risk management, and stakeholder relations.

References

1. Akter, N., & Mondal, M. S. A. (2023). Sustainable banking practices and their development: A study on banks operating in Bangladesh. *Journal of Business and Development Studies*, 2(1), 67–87.
2. Aracil, E., Nájera-Sánchez, J., & Forcadell, F. J. (2021). Sustainable banking: A literature review and integrative framework. *Finance Research Letters*, 42, 101932. <https://doi.org/10.1016/j.frl.2021.101932>
3. Azizzadeh, F., Islam, M. S., Naushin, N., Zupok, S., Soboń, D., Soboń, J., Selezneva, R., & Jadah, H. M. (2022). Modeling employees' skills for sustainable banking services. *Frontiers in Sociology*, 7, 985158. <https://doi.org/10.3389/fsoc.2022.985158>
4. De Haas, R. (2023). Sustainable Banking. EBRD Working Paper No. 282, Available at SSRN: <https://ssrn.com/abstract=4620166> or <http://dx.doi.org/10.2139/ssrn.4620166>
5. Dynkin, L., Desclee, A., Dubois M., Hyman, J., & Polbennikov, S. (2018). The case for sustainable bond investing strengthens. Barclays Bank PLS.
6. Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11), 2835–2857.
7. Eurobank Holdings (n.d.) Our ESG strategy for a strong economic, social and environmental impact, available on: <https://www.eurobankholdings.gr/en/esg-environment-society-governance>
8. Eurobank Holdings (n.d.) ESG Ratings and Performance, available at: <https://www.eurobankholdings.gr/en/esg-environment-society-governance/esg-aksiologiseis-epidoseis>
9. Eurobank (2024). Sustainability Policy Framework available on: <https://www.eurobank.gr/-/media/eurobank/omilos/esg/esg-environment-society-governance/pdf/sustainability-policy-framework.pdf>

10. Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233. <https://doi.org/10.1080/20430795.2015.1118917>
11. Goetsch, D. L., & Davis, S. B. (2014). *Quality management for organizational excellence: Introduction to Total Quality*. Upper Saddle River, NJ: Pearson.
12. Intesa Sanpaolo (n.d.). Sustainability Reporting, available at: <https://group.intesasanpaolo.com/en/sustainability/sustainability-reporting>
13. Jeucken, M. (2001). *Sustainable finance and banking: The financial sector and the future of the planet*. London: Routledge. <https://doi.org/10.4324/9781849776264>
14. Kontić, Lj., & Kontić, J. (2023). Strategic aspects of sustainability and digital transformation: A study in an international bank. *Bankarstvo*, 52(1), 48-73. <https://doi.org/10.5937/bankarstvo2301061K>
15. Marty, D. (2023). Rating Methodology. General Principles for Assessing Environmental, Social and Governance Risks. Cross-Sector Rating Methodology, Report Number: 1355824, Moody's Investors Service.
16. Morningstar (2023). Corporate Sustainability Report 2023, available at: <https://www.morningstar.com/company/corporate-sustainability>
17. National bank of Serbia (2024). Financial statements of banks, available at: https://www.nbs.rs/sr_RS/finansijske-institucije/banke/bilans-stanja/
18. Nosratabadi, S., Pinter, G., Mosavi, A., & Semperger, S. (2020). Sustainable banking: Evaluation of the European business models. *Sustainability*, 12(6), 2314. <https://doi.org/10.3390/su12062314>
19. Petrović Tomić, N. (2023). Sustainable Business – Are ESG Standards Powering the Resilience of a New Business Model? *Bankarstvo*, 52(2/3), 202-221. DOI: 10.5937/bankarstvo2303202P
20. Ramnarain, T. D., & Pillay, M. T. (2016). Designing sustainable banking services: The case of Mauritian banks. *Procedia - Social and Behavioral Sciences*, 224, 483-490. <https://doi.org/10.1016/j.sbspro.2016.05.424>
21. Rebai, S., Naceur Azaiez, M., & Saidane, D. (2016). A multi-attribute utility model for generating a sustainability index in the banking sector. *Journal of Cleaner Production*, 113, 835-849. <http://dx.doi.org/10.1016/j.jclepro.2015.10.129>
22. Riegler, M. (2023). Towards a definition of sustainable banking - a consolidated approach in the context of guidelines and strategies. *International Journal of Corporate Social Responsibility*, 8(5). <https://doi.org/10.1186/s40991-023-00078-4>
23. Saxena, D., Dhall, N., & Malik, R. (2021). Sustainable banking: A roadmap to sustainable development. *Corporate Governance and Sustainability Review*, 5(3), 42-56. <https://doi.org/10.22495/cgs-rv5i3p4>
24. Schaltegger, S., & Wagner, M. (Eds.). (2006). *Managing the business case of sustainability*. Sheffield: Greenleaf.
25. Schaltegger, S., & Lüdeke-Freund, F. (2012). The "Business Case for Sustainability" Concept: A Short Introduction (CSM Lüneburg Discussion Paper No. 22). Leuphana Universität Lüneburg. <https://ssrn.com/abstract=2094238>
26. Schaltegger, S., Lüdeke-Freund, F., & Hansen, E.G. (2012). Business cases for sustainability: The role of business model innovation for corporate sustainability. *International Journal of Innovation and Sustainable Development*, 6(2), 95-119. DOI: 10.1504/IJISD.2012.046944
27. Sredojević, S., & Sredojević, D. (2021). Sustainable finance - evolution or revolution in the banking sector. *Bankarstvo*, 50(2), 114-131. DOI: 10.5937/bankarstvo2102114S
28. <https://group.intesasanpaolo.com/en/sustainability>
29. <https://www.sustainalytics.com/esg-ratings>

RUBRIKA PREDSTAVLJAMO VAM



CDP - BEOGRAD

Cassa Depositi e Prestiti: misija i vizija

Od 1850. godine, Cassa Depositi e Prestiti (CDP) je jedna od glavnih pokretačkih snaga privrednog i društvenog razvoja Italije. Odgovornim korišćenjem poštanske štednje, CDP promoviše rast i zapošljavanje sa anticikličnom ulogom, podržavajući inovacije i poslovnu konkurentnost, infrastrukturu i lokalni razvoj. Njena tradicionalne osnovne delatnosti su podrška i finansiranje ključne infrastrukture i investicija javne uprave.

CDP je italijansko akcionarsko društvo koje kontroliše italijansko Ministarstvo ekonomije i finansija (MEF), sa privatnim manjinskim akcionarima (tj. bankarske fondacije) koji imaju zastupljenost u odboru i pojačana prava upravljanja. Ova javno-privatna priroda akcionara omogućava CDP-u da bude strpljiv investitor i da deluje u skladu sa tržišnom logistikom, ne gubeći iz vida svoje dugoročne ciljeve.

CDP Grupa je prvi i najvažniji zajmodavac italijanske javne uprave i ključni sponzor i savetnik za razvoj infrastrukture, pouzdan dugoročni investitor u relevantne italijanske kompanije koje kotiraju na berzi/ne kotiraju na berzi i u velike inicijative za infrastrukturu i nekretnine, kao i investitor na italijanskom tržištu rizičnog kapitala, privatnog kapitala i privatnog duga. CDP takođe pruža rešenja za podršku inovacijama i rastu italijanskih korporacija i malih i srednjih preduzeća, kao i podršku održivom rastu u zemljama u razvoju.

Tokom svoje istorije, CDP je evoluirao da podstakne rast u nekoliko drugih različitih sektora: od nekretnina do urbane regeneracije, od startapa do društvenih inovacija, od proizvodnje do savetovanja, CDP igra ključnu ulogu u brojnim strateškim inicijativama koje imaju za cilj promovisanje razvoja, kako na nacionalnom, tako i na međunarodnom nivou.

U 2024. godini, CDP je osvojio 1. mesto u sektorima „banke“ i „razvojne banke“ i ukupno 3. mesto na globalnom nivou u Morningstar Sustainalytics „ESG Risk Rating“ rangiranju.

Uloga CDP u međunarodnom razvoju i saradnji

CDP je 2015. godine imenovan za italijansku nacionalnu promotivnu instituciju i italijansku finansijsku instituciju za razvojnu saradnju, što mu je omogućilo da proširi obim svojih aktivnosti.

U svom mandatu, CDP podržava održivi razvoj zemlje partnera finansiranjem i ulaganjem u skladu sa preciznim ESG politikama i principima, i primenom principa „dodatnosti“ (eng. principle of additivity) u odnosu na tržište. Misija CDP-a je da održi investicije koje će izdržati test vremena, sa dugoročnim uticajem na razvoj partnerskih zemalja. CDP posluje u skladu sa Razvojnim ciljevima UN za 2030. i planovima Komisije EU i u sinergiji sa italijanskim sistemom saradnje, koji uključuje Ministarstvo spoljnih poslova i međunarodne saradnje (MAECI), Ministarstvo ekonomije i finansija (MEF) i Italijansku agenciju za razvojnu saradnju (AICS).

CDP-ovo delovanje u međunarodnoj saradnji fokusirano je na niz strateških sektora kao što su: klimatske promene, ublažavanje i prilagođavanje, zelena i digitalna transformacija, bezbednost hrane i infrastruktura. Pored toga, sprovodi projekte za održavanje inovacija malih i srednjih preduzeća i razvoj privatnog sektora kroz ulaganja u vlasničke ili dužničke fondove, zajmove, tehničku pomoć i ko-rišćenje kombinovanog finansiranja, posebno u okviru različitih evropskih programa i olakšava razvoj mreža između italijanskih i kompanija iz partnerskih zemalja.

CDP je aktivan član glavnih udruženja i mreža među međunarodnim institucijama za finansiranje razvoja, posebno: Finance in Common (FiCS), globalna mreža od 500+ javnih razvojnih banaka; the International Development Finance Club (IDFC), globalna mreža od oko 25 velikih javnih razvojnih banaka; European Development Finance Institutions (EDFI), udruženje od 15 evropskih razvojnih finansijskih institucija; Joint European Financiers for International Cooperation (JEFIC), mreža 5 glavnih evropskih javnih razvojnih banaka; i Forum des Caisses de Depot, mreža 15 institucija koje se bave mobilisanjem privatne štednje za podršku državnoj privredi i društvenom razvoju.

Danas, kao italijanska finansijska institucija za razvojnu saradnju, CDP ima portfolio kredita i investicija od 4,8 milijardi evra i 10 milijardi evra javnih resursa pod upravljanjem, što uključuje revolving fond za razvojnu saradnju, kojim se upravlja od 2016, kao i novoosnovani italijanski klimatski fond.

Ovaj inovativni finansijski instrument, sa ukupnom donacijom od 4,2 milijarde evra za intervencije, posvećen je finansiranju projekata ekološke tranzicije u zemljama u razvoju, u skladu sa oba- vezama koje je Italija preuzela na međunarodnom nivou u borbi protiv klimatskih promena.

CDP je 2024. godine pokrenuo širu strategiju sa ciljem jačanja svog prisustva i poslovanja u partnerskim zemljama sa ciljem da bude efikasniji u podsticanju lokalnog razvoja i održivih investicija kompanija u strateškim geografskim oblastima.

CDP na Zapadnom Balkanu

Zapadni Balkan je područje od strateškog interesa za Italiju na bezbednosnom, migracionom, ekonomskom i energetsom nivou. Italija igra važnu ulogu kao komercijalni partner Srbije, treća je po značaju posle Nemačke i Kine i jedan je od glavnih stranih investitora u zemlji (treći posle Nemačke i Švajcarske), sa velikim prisustvom kompanija u različitim strateškim sektorima. S druge strane, Italija je ključni ekonomski i trgovinski partner Srbije i Albanije, s obzirom na veliki broj italijanskih kompanija angažovanih u različitim strateškim sektorima. U Srbiji je 2021. godine poslovalo oko 1.200 italijanskih kompanija, koje su zaposlile oko 50.000 ljudi i doprinele 5,5% BDP-a zemlje; iste godine, još veći broj italijanskih kompanija - oko 2.700 - poslovaio je u Albaniji, što čini više od 40% stranih preduzeća koja posluju na lokalnom nivou.

U ovom kontekstu, Zapadni Balkan igra sve centralniju ulogu u široj strategiji koju sprovodi CDP da proširi svoj rad u podršci lokalnom održivom razvoju i rastu preduzeća u privredama u razvoju. Godina 2023. bila je kamen temeljac za uticaj CDP-a u Srbiji, pošto je u februaru te godine državni sekretar Republike Srbije, Goran Aleksić, otvorio u Beogradu prvo predstavništvo CDP-a van teritorije Evropske unije; a u martu iste godine, tokom Srpsko-italijanskog poslovnog foruma za ekonomsku i naučnu saradnju, CDP je potvrdio svoje angažovanje potpisivanjem Memorandum o razumevanju sa Vladom Srbije sa ciljem da identifikuje oblasti od zajedničkog interesa i planiranja, koje karakteriše veliki uticaj na Ciljeve održivog razvoja (SDG) i klimu, na kojima Strane mogu da sarađuju.

Ovaj angažman CDP-a ubrzo je praćen potpisivanjem tri finansijska aranžmana u okviru programa "Zeleno finansiranje za inkluziju" uz podršku sredstava EU, ukupne vrednosti od 50 miliona evra, uključujući i ugovor vredan 10 miliona evra sa Banca Intesa a.d. Beograd, ugovor vredan 40 miliona evra sa UniCredit Bank Srbija a.d. Beograd i kredit od 10 miliona evra kod Intesa Sanpaolo Albanija. Inicijativa je deo Investicionog okvira za Zapadni Balkan (Western Balkans Investment Framework - WBIF), koji promoviše Evropska unija u cilju povećanja obima finansijskih sredstava, stavljajući 120 miliona evra na raspolaganje za podršku najmanje 300 lokalnih preduzeća. CDP je, takođe, dao i kredit za likvidnost vredan 100 miliona evra Elektroprivredi Srbije, najvećem srpskom proizvođaču i distributeru električne energije, kako bi podržao dekarbonizaciju energetskog sektora u Srbiji i promovisao održive investicije kako bi se postigao cilj neto nule do 2050. godine.

Štaviše, CDP je, zajedno sa EBRD-om, glavni investitor u Fond za proširenje preduzeća II (ENEF II) sa doprinosom od 19 miliona evra, uz sredstva Evropske komisije za dodatnih 19 miliona evra i nemačke finansijske institucije KfV za 10 miliona evra. Glavni cilj CDP-a je da podrži rast lokalnih preduzeća na Zapadnom Balkanu poboljšavajući njihov učinak u oblasti životne sredine, društva i upravljanja (ESG). Sve u svemu, procenjuje se da će Fond do 2027. godine obezbediti do 100 miliona evra finansiranja u korist lokalnih preduzeća.

Još jedan korak koji obeležava konsolidaciju uloge koju CDP ima u promovisanju ekonomske saradnje u regionu usledio je u februaru 2024. godine, kada je CDP potpisao Memorandum o razumevanju sa Nacionalnim ekonomskim savetom Albanije.

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RUBRIKA PREDSTAVLJAMO VAM



SIMEST - BEOGRAD

Osnovan 1990. godine – nakon pada Berlinskog zida – po nalogu tadašnjeg ministra spoljne trgovine Renata Ruđera (Renato Ruggiero), **SIMEST je prvobitno imao za cilj da promoviše** stvaranje italijanskih mešovitih javno-privatnih preduzeća u postkomunističkim zemljama, koje su odjednom postala nova i perspektivna tržišta.

Od tada, SIMEST-ove **delatnosti su se proširile na ceo svet**, ali je njegova misija ostala nepromenjena: da obezbedi pravovremene i ciljane mere kao odgovor na sve veće potrebe italijanskih preduzeća koja ulaze na nova tržišta, podržavajući ih tokom celog ciklusa prekomorske ekspanzija.

Od početka 2020. godine, SIMEST-ove odgovornosti u vezi sa javnim fondovima prenete su, kao deo šire inicijative za internacionalizaciju, sa italijanskog Ministarstva privrede (MISE) na italijansko **Ministarstvo spoljnih poslova (Farnesina)**. Cilj je pojednostaviti i učiniti efikasnijim delatnosti koje podržavaju izvoz, promovišući jedinstveno upravljanje italijanskim komercijalnim međunarodnim planiranjem ekspanzije i uspostavljanje **jedinstvene institucionalne referentne tačke za internacionalizaciju i trgovinsku politiku**.

Do sada, SIMEST je podržao 15.300 italijanskih kompanija u njihovim projektima ekspanzije **u 125 zemalja** širom sveta.

Postoje tri glavne linije aktivnosti koje se sprovode sa sopstvenim resursima SIMEST-a, kao i uz upravljanje javnim fondovima.

Preko sopstvenih sredstava, SIMEST **stiće manjinski udeo** u srednjoročnim i dugoročnim projektima ekspanzije u inostranstvu, u partnerstvu sa **Fondom preduzetničkog kapitala**, kojim upravlja u ime Farnesine.

Kompanije koje žele da ojačaju svoje prisustvo u inostranstvu kroz investicije u produktivne, komercijalne ili tehnološke inovacije u okviru međunarodnog razvojnog programa, putem akvizicija ili grinfild investicija, u SIMEST-u mogu pronaći partnera koji im odgovara. Trenutni portfolio se sastoji od **233 projekta širom sveta, ukupne vrednosti 815 miliona evra**. Da bi podržao međunarodno orijentisane kompanije na putu ka održivoj tranziciji, SIMEST je **uveo podsticaje za projekte sa posebnim fokusom na veliki uticaj na životnu sredinu i društvo, povezujući specifične ključne indikatore učinka (KPI) za merenje**.

Preko javnog fonda – 394/81, SIMEST obezbeđuje finansiranje internacionalizacije, oblasti koja je pretrpela značajne promene i proširenja u poslednje 4 godine. Reč je o kreditima kojima se **upravlja u koordinaciji sa Ministarstvom spoljnih poslova Italije** ponuđenim po povoljnoj stopi (trenutno od 0,5%), a namenjenim međunarodnoj ekspanziji.

Jula 2023. godine, ovaj instrument je ponovo aktiviran i proširen, kako u asortimanu proizvoda koji se nude, sa fokusom na digitalne i održive inovacije i podršku imovini, tako i na ciljnu publiku, uključujući korisnike iz Fondovi preduzetničkog kapitala. Mogućnost praćenja celog lanca postaje sve važniji element za međunarodnu konkurentnost MISE.

Dodatno, obezbeđeni su podsticaji za **kompanije pogođene povećanjem troškova električne energije, a sredstva su opredeljena za kompanije sa direktnim interesima u strateškim oblastima za MISE**, kao što su Zapadni Balkan ili Afrika, i za one pogođene konkretnim krizama, kao što su kao područja pogođena nedavnim poplavama u Emiliji-Romanji i Toskani.

U prvoj polovini 2024. godine odobreni zahtevi za finansiranje internacionalizacije u okviru 394/81 iznose preko **1,4 milijarde evra** (+242% u odnosu na prvu polovinu 2023. godine) i podržavaju oko 3400 italijanskih kompanija, od kojih su 80% mala i srednja preduzeća.

Najnovija linija poslovanja, takođe vođena kroz upravljanje javnim fondom - 295/73, namenjena je italijanskim izvoznici. Obezbeđivanjem **bespovratnih sredstava**, SIMEST **ublažava troškove kamata** za srednjoročno i dugoročno povratno finansiranje (≥ 24 meseca), koje se odobrava stranim klijentima za potpisivanje izvoznih ugovora sa italijanskim kompanijama. Poslovanje se sprovodi u dvostrukom obliku kreditiranja kupca (buyer's credit), ključnog za finalizaciju srednjih do velikih izvoznih narudžbi (preko 50 miliona evra), i kreditiranja dobavljača (supplier's credit), vredne podrške za manje porudžbine u proizvodnom sektoru, prvenstveno uključujući mala i srednja preduzeća i srednje kapitalne kompanije.

Fond 295 ima trenutni portfolio podržanih porudžbina u ukupnom iznosu od preko **40 milijardi evra**, sa projektima odobrenim za preko 3,3 milijarde evra u prvoj polovini 2024. godine, prvenstveno za podršku sektoru brodogradnje, odbrane i proizvodnje.

SIMEST na Balkanu

Zemlje Balkana igraju ključnu ulogu u ekonomskom razvoju Evrope. Geografska blizina i sličnost proizvodnih sistema, koje karakteriše snažno prisustvo malih i srednjih preduzeća, čine ovaj region visoko integrisanim sa italijanskom privredom.

Podaci potvrđuju blisku komercijalnu vezu između dva sistema: poslednjih godina (2019-2023), bilateralna trgovina je porasla za preko 25%, premašivši 10 milijardi evra.

Imajući u vidu ove podatke, SIMEST je u 2023. godini izdvojio rezervu od 200 miliona evra iz Fonda 394 namenjen aktivnim italijanskim kompanijama (izvoznici ili uvoznici) na Zapadnom Balkanu. Sredstva su iscrpljena za nekoliko meseci, pa je u avgustu 2024. uspostavljena nova rezerva u istom iznosu za ispunjavanje daljih zahteva za finansiranjem.

Sa istim ciljem, SIMEST je odlučio da svoju konsultantsku delatnost započne otvaranjem kancelarije u Beogradu: kancelarija će biti referentna tačka za sve italijanske kompanije koje su već prisutne na teritoriji Balkana, kako komercijalno tako i industrijski, kao i za one koji žele da se prošire na nova tržišta. Otvaranje kancelarije potvrđuje strateški značaj Balkana za italijanska preduzeća i posvećenost SIMEST-a da ih podržava kroz namenske usluge.

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PRESENTING



CDP - BELGRADE

CASSA DEPOSITI E PRESTITI: MISSION AND VISION

Since 1850, Cassa Depositi e Prestiti (CDP) has been one of the main driving forces behind Italy's economic and social development. By using postal savings responsibly, CDP promotes growth and employment with a countercyclical role, supporting innovation and business competitiveness, infrastructure, and local development. Its traditional core business has been supporting and financing crucial infrastructures and investments of the public administrations.

CDP is an Italian joint-stock company (i.e. S.p.A.) controlled by the Italian Ministry of Economy and Finance (MEF), with private minority shareholders (i.e. Banking Foundations) having Board representation and reinforced governance rights. This public-private nature of its shareholder enables CDP to be patient investors and to act according to market logistics, without ever losing sight of its long-term objectives.

The CDP Group is the first and most important lender to the Italian Public Administration and key sponsor and advisor for infrastructure development, a reliable long-term investor in relevant Italian listed/unlisted companies and in major infrastructure and real estate initiatives as well as anchor investor in Italian venture capital, private equity and private debt markets. CDP also provides solutions to support innovation and growth of Italian corporates and Small and Medium Enterprises (SMEs) and the sustainable growth also in developing countries.

During its history, CDP has evolved to foster growth in several other different sectors: from real estate assets to urban regeneration, from startup to social innovation, from manufacturing to advisory, CDP plays a pivotal role in numerous strategic initiatives aimed at promoting development both at a national and at an international level.

In 2024, CDP has gained the 1st place in the "Banks" and "Development Banks" sectors and the 3rd place overall on a global scale in the Morningstar Sustainability "ESG Risk Rating" ranking.

CDP's role in International Development and Cooperation

In 2015 CDP has been appointed as the Italian National Promotional Institution and the Italian financial institution for Development Cooperation, a role that has allowed it to broaden the scope of its activities.

In its mandate, CDP supports partner countries' sustainable development by financing and investing according to precise ESG policies and principles, and by applying the principle of additionality with respect to the market. CDP's mission is to sustain investments that will stand the test of time, with a long-term impact on the development of Partner Countries. It operates in line with the 2030 UN Development Goals and the EU Commission plans and in synergy with the Italian Cooperation system, which includes the Ministry of Foreign Affairs and International Cooperation (MAECI), the Ministry for the Economy and Finance (MEF) and the Italian Agency for Development Cooperation (AICS).

CDP's action in international cooperation is focused on a series of strategic sectors such as: climate change, mitigation and adaptation, green and digital transformation, food security and infrastructure. Additionally, it pursues projects to sustain SMEs innovation and private sector development through investments in equity or debt funds, loans, technical assistance, and the use of blended finance in particular within different European programs and facilitate the development of networks between Italian and companies from partner countries.

CDP is an active member of the primary associations and networks among international development finance institutions, notably: Finance in Common (FiCS), global network of 500+ Public Development Banks; the International Development Finance Club (IDFC), a global network of c. 25 large Public Development Banks; European Development Finance Institutions (EDFI), the association of 15 European DFIs; Joint European Financiers for International Cooperation (JEFIC), a network of the 5 main European public development banks; and the Forum des Caisses de Depot, a network of 15 institutions active in mobilizing private savings in support of national economic and social development.

Today as the Italian financial institution for Development Cooperation CDP has a 3.8-billion-euro portfolio of loans and investments and a 10 billion euro of public resources under management, which includes the Revolving Fund for Development Cooperation, that has been managed since 2016, and the newly established Italian Climate Fund. This innovative financial instrument, with a total endowment of 4.2 billion euros for interventions, is dedicated to finance ecological transition projects in developing countries, in line with the commitments undertaken by Italy at the international level to fight the climate change.

In 2024 CDP has launched a broader strategy aimed at strengthening its presence and operations in Partner Countries with the aim of being more effective in fostering local development and companies' sustainable investments in strategic geographical areas.

CDP in the Western Balkans

The Western Balkans represent an area of strategic interest for Italy on a security, migratory, economic, and energetic level. Italy plays an important role as a commercial partner of Serbia, being third in importance after Germany and China and one of the main foreign investors in the country (third after Germany and Switzerland), with a large presence of companies in different strategic sectors. On the other side, Italy represents a key economic and trading partner for Serbia and Albania, given the great number of Italian companies engaged in various strategic sectors. In 2021 around 1,200 Italian companies had operations in Serbia, employing an estimated 50,000 people and contributing 5.5% to the country's GDP; in the same year, an even higher number of Italian companies - about 2,700 - had operations in Albania, accounting for more than 40% of the foreign enterprises operating locally.

In this context, the Western Balkans play an increasingly central role in the broader strategy pursued by CDP to expand its work in supporting the local sustainable development and the growth of enterprises in emerging economies. 2023 was cornerstone for CDP's footprint in Serbia, as in February the Serbian Secretary of State Goran Aleksić inaugurated in Belgrade the CDP's first ever representative office outside the European Union; and in March, during the Serbian Italian Business Forum for Economic and Scientific Cooperation, CDP confirmed its engagement by signing a MoU with the Serbian Government with the aim of identifying areas of common interest and planning, characterized by a high impact on the SDGs and the climate, on which the Parties can collaborate.

The engagement was swiftly followed by the signing of three financing arrangements, under the program "Green Finance for Inclusion" supported by the EU resources, worth a total of 50 million euro, including a 10-million-euro agreement with Banca Intesa Beograd, a 40-million-euro agreement with UniCredit Bank Serbia, and a 10 million euro loan with Intesa Sanpaolo Bank Albania. The initiative is part of the Western Balkans Investment Framework (WBIF) promoted by the European Union to increase the volume of financial resources by making 120 million euros available to support at least 300 local enterprises. The CDP also signed a EUR 100 million liquidity loan to EPS, Serbia's largest energy producer and distributor, to support the decarbonization of the energy sector in Serbia and promote sustainable investments to achieve net-zero target by 2050.

Moreover CDP, together with EBRD, is the main investor in the Enterprise Expansion Fund II (ENEF II) with a contribution of €19 million, joined by resources from the European Commission for an additional €19 million and the German financial institution KfW for €10 million. CDP's main objective is to support the growth of local enterprises in the Western Balkans improving their Environmental, Social and Governance (ESG) performance. Overall, it is estimated that the Fund will convey up to 100 million euros in financing for the benefit of local businesses by 2027.

Another step marking the consolidation of CDP's role in promoting economic cooperation in the region came on February 2024 when CDP signed an MoU with Albania's National Economic Council.

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PRESENTING



SIMEST - BELGRADE

Founded in 1990 - in the aftermath of the fall of the Berlin Wall - at the behest of the then Minister of Foreign Trade Renato Ruggiero, **SIMEST initially aimed to promote** the creation of Italian mixed public-private enterprises in post-communist countries, which had suddenly become new and promising markets.

Since then, SIMEST's **actions have expanded to cover the entire globe, but its mission has remained unchanged over time: to provide timely and targeted measures in response to the ever-evolving needs of Italian businesses entering new markets, supporting them throughout the entire cycle of overseas expansion.**

Since the beginning of 2020, SIMEST's responsibilities regarding public funds have been transferred, as part of a broader internationalization initiative, from the Italian Ministry of Enterprises and Made in Italy (MISE) to the **Italian Ministry of Foreign Affairs (Farnesina)**. The goal is to simplify and make more effective the actions supporting exports, promoting a unified management of Italy's commercial international expansion-planning and establishing a **single institutional reference point for internationalization and trade policy.**

Currently, SIMEST has supported 15,300 Italian companies in their expansion projects **in 125 countries** worldwide.

There are three main lines of activity, conducted with both SIMEST's own resources and the management of public funds.

Through its own funds, SIMEST **acquires minority stakes** in medium to long-term expansion projects abroad, in partnership with **the Venture Capital Fund**, managed on behalf of the Farnesina.

Companies looking to **strengthen their presence abroad** through **productive, commercial, or technological innovation investments** within an international development program, by way of acquisitions or greenfield investments, can find **in SIMEST the partner that suits them**. The current portfolio consists of **233 projects worldwide, totaling 815 million euros**. To support internationally oriented companies toward a sustainable transition, SIMEST has **introduced incentives for projects with a specific focus on high environmental and social impact, associating specific Key Performance Indicators (KPIs) for measurement**.

Through a public fund – the 394/81, SIMEST provides financing for internationalization, an area that has undergone significant changes and expansions in the last 4 years. These are loans, **managed in coordination with the Italian Ministry of Foreign Affairs** offered at a favorable rate (currently at 0.5%), intended for international expansion.

In July 2023, this instrument was reactivated and expanded both in the range of products offered, with a focus on digital and sustainable innovation and asset support, and in the target audience, including beneficiaries from **export-oriented production chains**. The traceability of the entire chain is becoming an increasingly crucial element for the international competitiveness of Made in Italy.

Additionally, incentives have been provided **for companies affected by increases in energy costs, and resources have been allocated for companies with direct interests in strategic areas for Made in Italy**, such as the Western Balkans or Africa, and for those affected by specific events, such as the areas hit by the recent floods in Emilia-Romagna and Tuscany.

In the first half of 2024 the approved requests for financing for internationalization under 394/81 amount to over **1.4 billion euros** (+242% vs first half of 2023) supporting around 3400 Italian companies, 80% of which SMEs.

The latest line of operations, also conducted through the management of a public fund - the 295/73, is aimed at Italian exporters. Through the **provision of grants**, SIMEST **mitigates the interest cost** of medium to long-term repayable financing (≥ 24 months), granted to foreign clients for the signing of export contracts with Italian companies. The operations are carried out in the dual form of **Buyer's Credit** crucial for finalizing medium to large export orders (exceedingly approximately 50 million euros), and **Supplier's Credit**, valuable support for smaller orders in the manufacturing sector, primarily involving SMEs and Mid-Caps.

The 295 Fund has a current portfolio of supported orders totaling over **40 billion euros**, with projects approved for over **3.3 billion euros** in the first half of 2024, primarily supporting the shipbuilding, defense, and manufacturing sectors.

SIMEST and the Balkan Region

The countries of the Balkan region play a key role in the economic development of Europe. The geographical proximity and similarity of production systems, characterized by a strong presence of SMEs, make this region highly integrated with the Italian economy.

Data confirms a close commercial relationship between the two systems: in recent years (2019-2023), bilateral trade has grown by over 25%, surpassing 10 billion euros.

In light of these data, in 2023, SIMEST set aside a reserve of 200 million euros from the 394 Fund dedicated to active Italian companies (exporters or importers) in the Western Balkans. The resources were exhausted in a few months, so in August 2024 a new reserve of the same amount was established to meet further funding requests.

With the same objective, SIMEST decided to inaugurate its consulting activity by opening an office in Belgrade: the office will be the reference point for all Italian companies already present in the Balkan territory, both commercially and industrially, and for those wishing to expand into these new markets. The opening of the office confirms the strategic importance of the Balkan region for Italian businesses and SIMEST's commitment to supporting them through dedicated services.

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BAROMETAR/BAROMETER

MAJ 2024 – DECEMBAR 2024. / MAY 2024 - DECEMBER 2024

1. PROMET / TURNOVER

Mesec/Month	Listing	Open Market	Regulisano tržište/Regulated market	MTP/MTF	Ukupno/Total	Broj transakcija/ Number of transactions
Maj 2024	917.646.327	57.943.257,00	975.589.584	0,00	975.589.584	1.392,00
Jun 2024	576.665.560	64.307.453,00	640.973.013	0,00	640.973.013	1.283,00
Jul 2024	2.317.092.857	195.072.160,00	2.512.165.017	814,00	2.512.165.831	1.631,00
Avgust 2024	1.675.772.616	160.454.233,00	1.836.226.849	0,00	1.836.226.849	1.163,00
Septembar 2024	5.169.615.177	341.535.351,00	5.511.150.528	0,00	5.511.150.528	1.500,00
Oktobar 2024	6.231.924.287	170.560.408,00	6.402.484.695	0,00	6.402.484.695	1.787,00
Novembar 2024	4.623.121.958	83.100.447,00	4.706.222.405	0,00	4.706.222.405	1.530,00
Decembar 2024	2.998.570.811	169.014.021,00	3.167.584.832	58.920,00	3.167.643.752	1.931,00
	24.510.409.594	1.241.987.330,00	25.752.396.924	59.734,00	25.752.456.658	12.217,00

*RSD

2. INDEKSI / INDICES

Maj 2024. god. Dec 2024. god.		BELEX 15	BELEXline
	Poslednja vrednost / Last value	1.146,76	2.453,68
	Promena (abs) / Change (abs)	141,61	245,22
	Promena (%) / Change (%)	14,09%	11,10%
	Najviša vrednost / Maximum value	1.154,26	2.489,26
	Najniža vrednost / Minimum value	968,08	2.189,25
	Istorijski max / History maximum value	3335,2	5007,34
	Istorijski min / History minimum value	347,46	841,99
	Vrednost prometa / Value of turnover	1.069.128.671	1.519.042.603

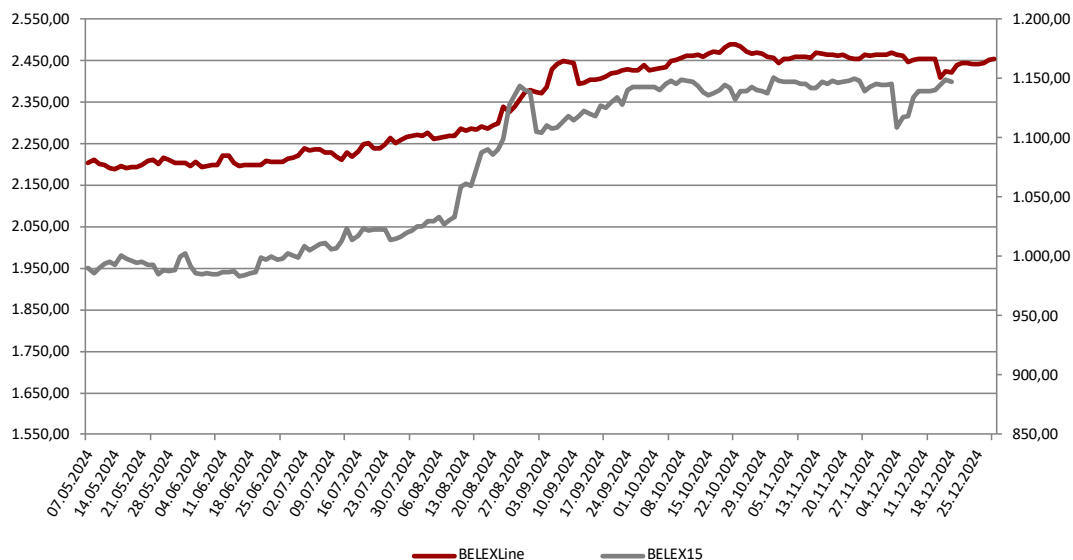
3. TRŽIŠNA KAPITALIZACIJA / MARKET CAPITALISATION

	Oktobar	Novembar	Decembar
Ukupna tržišna kapitalizacija/ Total market capitalisation	491.154.991	485.980.773	480.714.515
Regulisano tržište/Regulated Market	482.763.624	477.590.030	472.358.918
Prime Listing – akcije/ Prime Listing – shares	225.537.642	221.471.297	216.408.407
Open Market	257.225.981	256.118.733	255.950.510
MTP/MTF	8.391.366	8.390.742	8.355.597
BELEX15	291.413.469	289.276.434	284.973.262
BELEXline	310.675.611	308.809.454	304.329.947

*u hiljadama RSD/in RSD thousands

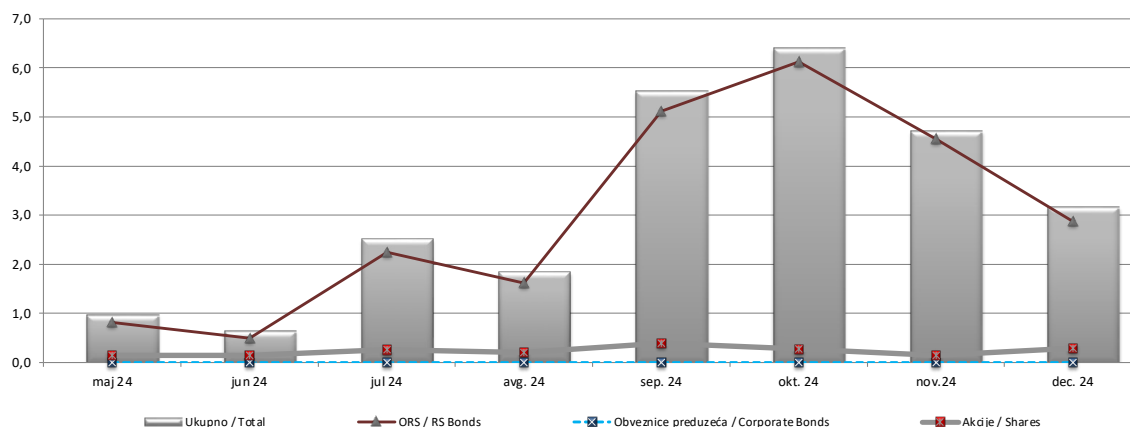
4. UČEŠĆE STRANIH INVESTITORA / FOREIGN INVESTORS PARTICIPATION

Maj 2024 – Dec 2024	Učešće stranih investitora / Foreign Investors Participation		
	FIS	total	8,63%
		b-FIS	13,64%
		s-FIS	3,62%
	FIB		0,38%
	FIT		0,98%



	Ukupno / Total	ORS / RS Bonds	Obveznice preduzeća / Corporate Bonds	Akcije / Shares
maj 24	975.589.584	823.409.543	0	152.180.041
jun 24	640.973.013	496.826.493	0	144.146.520
jul 24	2.512.165.831	2.249.298.610	0	262.867.221
avg. 24	1.836.226.849	1.624.151.136	0	212.075.713
sep. 24	5.511.150.528	5.121.453.331,53	0	389.697.196
okt. 24	6.402.484.695	6.129.441.794,11	0	273.042.901
nov.24	4.706.222.405	4.555.616.754,46	0	150.605.651
dec. 24	3.167.643.752	2.872.656.035,27	0	294.987.717

Promet po vrsti hartije



*u dinarima/ RSD



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- Posle naslova rada napisati rezime/apstrakt dužine do 150 reči.
- Posle rezimea dati do 10 ključnih reči, pogodnih za indeksiranje i pretraživanje.
- Osim glavnog naslova (naslova rada) koristiti u tekstu do dva nivoa naslova, bez numeracije.
- Početak pasusa kucati od početka kolone (bez tabulatora).
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- Tabela po širini ne sme da prelazi margine, a po dužini ne sme biti duža od jedne stranice i mora imati naslov i izvor.
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- The title of the paper should be short and clear.
- After the title of the paper, write a summary/abstract of up to 150 words.
- After the summary, provide up to 10 keywords, suitable for indexing and searching.
- In addition to the main title, use up to two levels of headings in the text, without numbering.
- The beginning of the paragraph should be typed from the beginning of the column (without the indent).
- If the text is accompanied by diagrams or charts, mark their intended position in the paper, and create them in either Word, Excel, or PowerPoint.
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- In text and tables, do not use text boxes.
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