ANALIZA FAKTORA RIZIKA FINANSIJSKE I PROFITNE POZICIJE U CILJU UNAPREĐENJA VITALNOSTI SEKTORA ENERGETIKE

Miroslav Čavlin[5], Jelena Vapa-Tankosić[6], Zoran Davidovac[7], Ivaniš Miloš[8]

Apstrakt

Ovaj rad se bavi istraživanjem rizika profitne i finansijske pozicije energetske delatnosti u periodu Covid-19, odnosno sektora D – Proizvodnja i snabdevanje električnom energijom, gasom i vodom podsektora 351 - Proizvodnja, prenos i distribucija električne energije, 352 - Proizvodnja gasa i distribucija gasovitih goriva gasovodima i 353 - Snabdevanje parom i klimatizacija putem odabranih pokazatelja za 2020. godinu u odnosu na prethodnu 2019. godinu, te ih vrednuje u odnosu prema prosečnim petogodišnjim ostvarenjima. Daljom analizom po podsektorima, uočavaju su razlike u oceni finansijske, ali i profitne pozicije po podsektorima u odnosu na sektorske ocene. Rezultati istraživanja pokazuju da u kratkom roku nije zapaženo pogoršanje faktora rizika profitne i finansijske pozicije, na bazi godišnjih bilansnih iskaza analiziranih kategorija, na nivou celine energetskog sektora. Regresionom analizom ispitan je i uticaj parametara likvidnosti i solventnosti na stopu povrata aktive u periodu pre Covid-19 i u toku Covid-19 pandemije.

Ključne reči: likvidnost, solventnost, energetika, Republika Srbija, pandemija Covid-19.

JEL: G32, M40

Uvod

Pitanje vitalnosti modernog preduzeća, kao obeležja celine, ne podrazumeva ispunjavanje minimalnih uslova poslovanja, već mnogo više od toga – održanje

---

[5] Redovni profesor, Fakultet za ekonomiju i inženjerski menadžment, Cvećarska ulica br. 2, 21000 Novi Sad, Srbija, E-mail: cmiros@gmail.com

[6] Redovni profesor, Fakultet za ekonomiju i inženjerski menadžment, Cvećarska ulica br. 2, 21000 Novi Sad, Srbija, E-mail: jvapa@gmail.com

[7] Asistent sa doktoratom, Beogradska akademija poslovnih i umetničkih strukovnih studija, Odsek poslovnih i informatičkioh studija, Kraljice Marije br. 73, 11050 Beograd, Srbija, E-mail: zoran.davidovac@bpa.edu.rs

[8] Student doktorskih studija Fakultet za ekonomiju i inženjerski menadžment, Cvećarska ulica br. 2, 21000 Novi Sad, Srbija,E-mail: mivanis97@gmail.com

pune poslovne snage („života“). Naravno, jačanjem vitalnosti poboljšavaju se izgledi za trajno jačanje postignuća preduzeća, u holističkom kontekstu, a time i finansijskih postignuća. Finansijska vitalnost se fokusira na sposobnost održavanja dinamičke ravnoteže u odnosu na promenjive eksterne faktore poslovanja, te istovremeno i u odnosu na interne faktore poslovanja, pri čemu integralno sagledava pitanja likvidnosti, adekvatnosti izvora finansiranja i imovine, generisanja profita i vrednosti za vlasnike i druge stejkoholdere. S tim u vezi ističe se ključni značaj analize finansijske i profitne pozicije za održanje finansijske vaitalnost preduzeća odnosno konkretnije, pitanje analize kategorija likvidnosti i profita. Likvidnost predstavlja primarnu meru opstanka ili nestanka preduzeća, a profit je tradicionalna, primarna mera održanja i rasta preduzeća.

Predmet izučavanja ovog rada će sagledati problematiku finansijske vitalnosti preduzeća industrijske delatnosti sektora D – Proizvodnja i snabdevanje električnom energijom, gasom i vodom u Republici Srbiji, a u periodu i uslovima poslovanja zahvaćenim pandemijom Covid-19 sa akcentom na nedovoljno istražene probleme finansijske vitalnosti, tj. profitne i finansijske pozicije kao snažnog i značajnog instrumenta konkurentne sposobnosti, koji utiče na ukupan privredni razvoj države. Istraživanje je struktuirano na sledeći način: u prvom delu istraživanja opisuje se značaj finansijske vitalnosti preduzeća u savremenoj ekonomiji; drugi deo istraživanja obuhvata metodologiju za analizu postojećih pokazatelja za 2020. u odnosu na prethodnu 2019. godinu, te ih vrednovati sa prosečnim petogodišnjim ostvarenjima u okviru sektora D – Proizvodnja i snabdevanje električnom energijom, gasom i vodom podsektora 351 - Proizvodnja, prenos i distribucija električne energije; 352 - Proizvodnja gasa i distribucija gasovitih goriva gasovodima i 353 - Snabdevanje parom i klimatizacija; treći deo istraživanja se bavi analizom dobijenih rezultat; u četvrtom delu istraživanja biće sublimirana saznanja u cilju unapređenja finansijske vitalnosti.

Pregled literature

Moderan smisao postojanja i delovanja preduzeća kao kompleksa je izražen na sledeći način: „ekonomski smisao poslovanja je proizvodnja vrednosti i uvećanje bogatstva kao kapitala, povećavanje sposobnosti za poslovnu aktivnost ili povećanje imovine, znanja i veština, ali i kao poboljšanje odnosa među ljudima radi kapitala, imovine, sticanja znanja i veština te uslova življenja“ (Tintor, 2009, str. 159). Dakle, poslovne odluke više ne mogu biti usmerene samo na ciljeve; one moraju težiti ka holističkom kontekstu. Holistički kontekst za jedno preduzeće je kontekst koji obuhvata sve ciljeve i akcije koji vode ka realizaciji vizije, odnosno misije zbog kojih je preduzeće inicijalno i osnovano (Marković i Krmpot, 2014).

„Likvidnost predstavlja najvažniju, ali i prvu pojavnu kratkoročnu upravljačku veličinu, koja determiniše postojanje ili nepostojanje mogućnosti opstanka preduzetnika (preduzeća), pre svega, finansijskog poverenja među poslovnim

partnerima − suprotno, opstanak ili stečaj" (Malešević i Čavlin, 2020, str. 56). Sve brži razvoj finansijskih proizvoda i instrumenata na finansijskom tržištu, koji su bili u funkciji diverzifikacije i transfera rizika na relaciji finansijski – realni sektor, uticao je da investitori posvete više pažnje razumevanju i upravljanju rizicima kojima se izlažu (Ivanović, 2020). Nijedno preduzeće nije pošteđeno krize, a uspešno upravljanje krizom podrazumeva (Osmanagić−Bedenik, 2003):

a) anticipativno upravljanje krizom, tj. preventivno delovanje, predusretanje krize (uvođenje mera opreza, prevencije);
b) identifikaciju krize (je li nastupila, kako je prepoznati, koje je snage?);
c) reaktivno upravljanje krizom, tj. ovladavanju krizom (šta učiniti kako bi se uspešno „izašlo" iz krize?).

Krizni menadžment prati sve faze kriznog razvoja, nastoji preventivno delovati, a u krajnjem slučaju deluje kad je kriza već nastupila. S kriznim fazama, naime, raste i pritisak delovanja, dok se istovremeno smanjuje manevarski prostor potreban za sanaciju i restrukturiranje. Što je proces propadanja preduzeća više uznapredovao, to su slabiji izgledi za njegovo ozdravljenje. Krizni menadžment pomaže u izbegavanju poslovne krize i merama predostrožnosti, tj. preventivnim delovanjem, ublažava posledice krize – reaktivno, u zavisnosti od uzroka i faze razvoja krize (Malešević i Čavlin, 2020, str. 75). Strategijski kontroling usmeren je na delovanje zaposlenih sa svrhom ostvarivanja dobiti preduzeća, povećanja njegove vitalnosti i poboljšanja njegovih mogućnosti za trajan uspeh. Pri tome, vitalnost preduzeća se sagledava (Malešević i Čavlin, 2020, str.76):

- „kao sposobnost prilagođavanja (aktivno i reaktivno) i
- sposobnost napredovanja (očuvanje i razvijanje identiteta kroz iskustvo i učenje), a da bi obezbedilo vitalnost u današnjem kriznom okruženju, preduzeće mora da reaguje, na osnovu obuhvata celovitih informacionih rersursa, i da razume poremećaje, i identifikuje uzroke radi pravovremene i svrsishodne terapije otklanjanja krize".

Stoga se u okviru strategijskog kontrolinga obavljaju sledeće aktivnosti: „analiza prednosti i slabosti organizacije, analiza organizacionih potencijala, analiza okruženja, analiza životnog ciklusa proizvoda, /usluga. Break-even anlaiza, return-on-investment analiza i analiza imidža organizacije" (Lekić, Davidovac i Lekić, 2021, str. 256).

Globalna tržišta su suočena sa jednom od najtežih pandemija u modernoj istoriji. Širom sveta finansijska tržišta su u ozbiljnim teškoćama, čije posledice su počele da se prelivaju i u realni sektor. Krizom su najviše pogođene zemlje koje u velikoj meri zavise od turizma, saobraćaja i drugih privrednih delatnosti, a koje su najviše pogođene merama ograničenja kretanja (Marjanović i Đukić, 2020). Industrijska proizvodnja EU-a u 2020. godini smanjila se za 7% u odnosu na 2019. godinu zbog pandemije Covid-19, dok se više od 75% vrednosti proizvodnje EU-a

odvijalo u šest država članica: Nemačka (29% ukupnog broja članica EU-a), Italija (18%), Francuska (12%), Španija (9%), Poljska (5%) i Holandija (3%) (Eurostat, www. https://ec.europa.eu/eurostat/). Vlade, centralne banke i regulatorna tela trude se da pospeše likvidnost na tržištu, uvodeći nove monetarne i finansijske mere, kao i poreske olakšice jer je Covid-19 prouzrokovao oštre kontrakcije u ekonomskom razvoju, smanjenje likvidnosti i otežan pristup kapitalu. Rezultati istraživanja ukazuju da se su centralne banke okrenule nekonvencionalnim monetarnim merama poput sniživanja kamatnih stopa i obaveznih rezervi za banke, ublažavanja uslova za kolateral, povećanja obima repo operacija i svop aranžmana, kao i programima kvantitativnog popuštanja (Čavlin, Vapa Tankosić i Egić, 2021; Vapa Tankosić, Čavlin i Buđevac, 2020).

Posmatrano po delatnostima, u Republici Srbiji najznačajnije učešće u formiranju BDP-a u 2020. godini imali su: sektor prerađivačke industrije (13,3%), sektor trgovine na veliko i malo i popravke motornih vozila (11,3%), sektor poslovanja nekretninama (7,0%), sektor poljoprivrede, šumarstva i ribarstva (6,3%), sektor informisanja i komunikacija (5,4%) i sektor građevinarstva (5,4%). Sektor D – Proizvodnja i snabdevanje električnom energijom, gasom i vodom je činio 3,2% u formiranju BDP-a u 2020. godini dok je njegova stopa realnog rasta u istoj godini, iznosila 0,9%. U tom sektoru ostvaren je prihod od RSD 177.420 miliona, što predstavlja blagi pad u odnosu na prihod iz 2019. godine kada je ukupno iznosio RSD 171.978 miliona (Republički zavod za statistiku, https://www.stat.gov.rs/).

Upravo stoga, ovaj rad ima za cilj da izuči pitanje održanja finansijske vitalnosti Sektora D – Proizvodnja i snabdevanje električnom energijom, gasom i vodom, imajući u vidu postojeće krizne uslove koji su uzrokovali poremećaje u međunarodnoj razmeni i transportu, ceni energije, hrane, u kontekstu njegovog značaja za vitalnost privrede Srbije.

Metodološki okvir istraživanja

Za potrebe istraživanja oblikovan je uzorak preduzeća koja su klasifikovana na područja delatnosti poslovnim strukturnim statistikama Republičkog zavoda za statistiku Srbije. a pokazatelji su izvedeni iz javno dostupnih informacija, odnosno zvaničnih finansijskih izveštaja, koje su predmetna preduzeća dostavila Agenciji za privredne registre Republike Srbije, te iz neposrednog uvida u izveštaje preduzeća. Prema dostupnim podacima od ukupnog broja preduzeća koja su pripremila i predala godišnje finansijske izveštaje, a za potrebe istraživanja, uvažavajući kriterijum delatnosti, oblikovan je uzorak i prikupljeni relevantni podaci za period 2019–2020. godinu.

Izvršena je analiza likvidnosti industrijske delatnosti po sektorima i oblastima putem odabranih pokazatelja za 2020. godinu u odnosu na prethodnu godinu, i primenom deskriptivnih statističkih metoda identifikovana je reprezentivnost prosečnih vrednosti na primeru pokazatelja tekuće likvidnosti sektora D –

Proizvodnja i snabdevanje električnom energijom, gasom i vodom podsektora 351 - Proizvodnja, prenos i distribucija električne energije; 352 - Proizvodnja gasa i distribucija gasovitih goriva gasovodima i 353 - Snabdevanje parom i klimatizacija. U daljem tekstu koristiće se pripadajuće slovne oznake za sektore, a pripadajuće numeričke oznake za podsektore.

U ovom istraživanju biće upotrebljena regresiona analiza uticaja dve ili više objašnjavaćih varijabli na zavisnu varijablu, tj. višestruka ili multiple regresija. Ovom regresijom smo utvrdili koliko procenata varijabiliteta zavisne varijable je objašnjeno određenim skupom nezavisnih varijabli i koliki je relativni doprinos svake nezavisne varijable uključene u regresionu analizu. Višestruka logistička regresija je statistički metod na osnovu kojeg se ispituje uticaj više nezavisnih faktora na jedan zavisni faktor (Rosner, 2011; Radović-Marković i Hanić, 2018):

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k + \varepsilon$$

gde su:

$x_1, x_2, ..., x_k$ nezavisne (objašnjavajuće) varijable ili prediktori

$\beta_0, \beta_1, \beta_2, ..., \beta_k$ regresioni koeficijenti ili regresioni parametri

ε stohastički član ili slučajna greška koja obuhvata efekte svih drugih varijabli

(izuzev varijabli $x_1, x_2, ..., x_k$) koje nisu direktne uključene u regresioni model.

U okviru sektora D – Proizvodnju i snabdevanje električnom energijom, gasom i vodom i njegovih podsektora, u cilju ispitivanja uticaja nezavisnih varijabli (parametara likvidnosti i solventnosti) u periodu pre Covid-19 (2015–2019. godina) i u toku Covid-19 pandemije (2020. godina) na stopu povrata aktive regresionom analizom. Autori su uzeli za nezavisne varijable: Koeficijent tekuće likvidnosti (opšti racio likvidnosti), Koeficijent trenutne likvidnosti (novčani racio likvidnosti), Koeficijent ubrzane likvidnosti (rigorozni racio likvidnosti), Solventnost (dinamički pokazatelj) i Zaduženost. Zavisna varijabla je Stopa povrata aktive. Za analizu podataka ovog rada upotrebljen je statistički programski paket SPSS.

Rezultati i diskusija

Uzorak obuhvata preduzeća iz Sektora D i njegovih podsektora, a istraživanje započinjemo analizom profitne i finansijske pozicije na nivou celine Sektora D. Rezultati istraživanja prikazani su u *Tabeli 1*.

Tabela 1. Dinamika poslovnog prihoda, poslovnog i neto dobiti/gubitka u okviru sektora D – Proizvodnju i snabdevanje električnom energijom, gasom i vodom u Republici Srbiji za 2019–2020. i 2015–2019. godinu

Kategorije	D - Snabdevanje električnom energijom, gasom, parom i klimatizacija (2019)	D - Snabdevanje električnom energijom, gasom, parom i klimatizacija (2020)	Stopa +/- 2019/2020	Prosečna stopa +/- 2015/2019
Poslovni prihodi	620.730.391,00	609.931.925,00	-0,02	-0,01
Poslovni dobitak	34.528.345,00	41.291.691,00	0,20	-0,07
Poslovni gubitak	9.714.309,00	4.056.194,00	-0,58	0,49
Neto dobitak	22.532.708,00	23.112.619,00	0,03	0,04
Neto gubitak	18.565.905,00	6.312.841,00	-0,66	0,37

Izvor: Istraživanje autora

Analizom dobijenih rezultata iz *Tabele 1* moguće je istaći sledeće ocene:
▪ posmatrajući 2019–2020. godinu na nivou sektora sektora D pad prihoda je bio neznatan (2%) i
▪ kod sektora D data tendencija oscilacije prihoda praćena je solidnim povećanjem poslovnog i neto dobitka, i značajnim smanjenjem poslovnih i neto gubitaka, čiji je kvalitet još značajniji kada se uporedi sa prosečnom stopom rasta poslovne i neto dobiti te prosečnom stopom smanjenja poslovnih i neto gubitaka za period 2015–2019. godine.

Možemo zaključiti da su profitna pozicija i kvalitet Sektora D u posmatranom periodu bili stabilni.

Tabela 2. Pregled pokazatelja likvidnosti i solventnosti u Republici Srbiji u okviru sektora D – Proizvodnju i snabdevanje električnom energijom, gasom i vodom u Republici Srbiji za 2019–2020. i 2015–2019. Godinu

Kategorije	D - Snabdevanje električnom energijom, gasom, parom i klimatizacija (2019)	D - Snabdevanje električnom energijom, gasom, parom i klimatizacija (2020)	Stopa +/- 2019/2020	Prosečna stopa +/- 2015/2019
Koeficijent perspektivne likvidnosti (opšti racio likvidnosti)	0,81	0,78	-0,04	0,69
Koeficijent trenutne likvidnosti (gotovinski racio likvidnosti)	0,11	0,13	0,20	0,13
Koeficijent efektivne likvidnosti (rigorozni racio likvidnosti)	0,61	0,60	-0,01	0,55
Prosečan period "gotovinskog ciklusa" (u danima)	112,57	115,40	0,03	90,81
Prosečno vreme naplate potraživanja (u danima)	68,20	73,79	0,08	84,05
Prosečno vreme plaćanja dobavljačima (u danima)	119,66	124,57	0,04	133,26
Vreme obrta zaliha (u danima)	164,03	166,17	0,01	140,02
Solventnost (dinamički pokazatelj)	3,70	6,05	0,64	4,95

Izvor: Istraživanje autora

Analizom dobijenih rezultata iz *Tabele 2* moguće je izvesti sledeće ocene:

▪ Prosečne vrednosti koeficijenta opšte likvidnosti preduzeća na nivou Sektora D u Republici Srbiji su znatno niže od poželjene teorijske norme (≥2) što implicira ugroženost uslova za održanje likvidnosti, s tim da je prisutan neznatan pad u odnosu na prethodnu godinu, kao i primetno niže vrednosti od prosečnih vrednosti za period 2015–2019. godine;

▪ Prosečne vrednosti koeficijenta ubrzane likvidnosti preduzeća u analiziranom sektoru u Republici Srbiji pokazuje da su manja od poželjene teorijske norme

(≥1) što implicira da preduzeća nemaju dovoljno brzo unovčive imovine za izmirenje kratkoročnih obaveza. Rast vrednosti pokazatelja je minimalan kod sekora D u odnosu na prethodnu godinu, a data vrednost je više od njegove prosečne vrednosti za period 2015–2019. godine;

- Prosečne vrednosti koeficijenta trenutne likvidnosti preduzeća u analiziranom sektoru u Republici Srbiji u kontekstu datih vrednosti koeficijenata opšte i ubrzane likvidnosti impliciraju da preduzeća nemaju dovoljno brzo unovčive imovine za izmirenje kratkoročnih obaveza;
- Dalji razvoj analize, upotpunjujemo rezultatima vrednosti dinamičkih pokazatelja likvidnosti radi celovitijih zaključaka o likvidnosti analiziranog sektora, a moguće je primetiti da je došlo do produženja perioda gotovinskog ciklusa;
- Analizom strukture elementa gotovinskog ciklusa Sektora D može se uočiti da je primetno produženje gotovinskog ciklusa za 3,00%, a da je presudan negativan uticaj produženja perioda naplate potraživanja, zatim perioda obrta zaliha, a koji je praćen produženjem perioda isplate dobavljača, uz primetno duže trajanje gotovinskog ciklusa u odnosu na prosek u periodu 2015–2019. godine;
- Pokazatelj zaduženosti kao odnos ukupnih obaveza (kratkoročna i dugoročna) i ukupne imovine govori koliko se društvo finansira iz tuđih izvora odnosno iz tuđeg kapitala. Što je pokazatelj veći preduzeće je zaduženije i veći je rizik investirati u samo preduzeće. Poželjna iskustvena norma je da pokazatelj zaduženosti ne prelazi vrednost 0,5 iz razloga što bi preduzeće trebalo da preferira finansiranje iz sopstvenih na račun iz tuđih izvora. Vrednosti pokazatelja zaduženosti u Sektoru D su niže od 0,5 i pokazuju prevagu finansiranja sopstvenih u odnosu na tuđe izvore. U Sektoru D je došlo do neznatnog smanjenja stepena zaduženosti u 2020. godine u odnosu na 2019. godinu, a tik ispod njegovog proseka za 2015–2019. godinu.
- Iskustvene norme u praksi ukazuju da je veća vrednost pokazatelja pokrića troškova kamata (dinamičke solvetnosti) bolja, pa se smatra da je vrednost od 3-7 solidna, a preko 7 poželjna. Prikazani, rezultati pokrića troškova kamata prikazuju značajne razlike u finansijskoj moći, odnosno stepenu generisanja operativne gotovine za plaćanje kamata za kredite. Pokazatelj dinamičke solventnosti Sektora D povećao se za skoro 2/3 u 2020. prema 2019. godini, a ujedno iznad njegovog proseka za period 2015–2019. godine, što implicira solidnu finansijsku moć. Kod Sektora D prisutna je tendencija produženja perioda gotovinskog ciklusa usled dominacije prosečne starosti kupaca i zaliha, kao i blagog poboljšanja stepena zaduženosti, koje je praćeno jačanjem finansijske moći. Dalju analizu razvijamo analizom tri podsektora u sektoru energetike.

Tabela 3. Dinamika poslovnog prihoda, poslovnog i neto dobiti/gubitka za sektor i podsektore energetike u Republici Srbiji za 2019–2020. i 2015–2019. godinu

Kategorije	Poslovni prihodi	Poslovni dobitak	Poslovni gubitak	Neto dobitak	Neto gubitak
"351" (2019)	462.774.261,00	23.807.470,00	7.513.243,00	6.311.409.00	9.447.849,00
"351" (2020)	457.724.605,00	26.602.201,00	3.549.615,00	15.672.906,00	3.338.818,00
Stopa +/- 2019/2020	-0,01	0,12	-0,53	1,48	-0,65
Prosečna stopa +/- 2015/2019	-0,01	0,03	0,52	-0,21	0,27
"352" (2019)	103.167.573,00	6.855.212,00	1.345.774,00	5.137.704,00	8.573.784,00
"352" (2020)	99.118.546,00	10.559.662,00	16.434,00	3.647.094,00	1.740.148,00
Stopa +/- 2019/2020	-0,04	0,54	-0,99	-0,29	-0,80
Prosečna stopa +/- 2015/2019	0,04	-0,11	2,78	1,18	8.19
"353" (2019)	54.788.557,00	3.865.663,00	855.292,00	11.083.595,00	544.272,00
"353" (2020)	53.088.774,00	4.129.822,00	490.145,00	3.792.619,00	1.233.875,00
Stopa +/- 2019/2020	-0,03	0,07	-0,43	-0,66	1,27
Prosečna stopa +/- 2015/2019	-0,01	0,03	0,25	0,49	-0,10

Izvor: Istraživanje autora

Dalje istraživanje nastavljamo analizom profitne i finansijske pozicije po podsektorima „351", "352" i „353" Sektora D, a analizom dobijenih rezultata iz *Tabele 3* moguće je istaći sledeće ocene:

▪ u sa tri podsektora došlo je do pada poslovnih prihoda u 2020. u odnosu na 2019. godinu, s tim što je kod podsektora "352" i "353" nešto veći pad u odnosu na podsektor "351" koji je neznatan (1%).

▪ kod podsektora "351" data tendencija oscilacije prihoda praćena je solidnim povećanjem poslovnog i neto dobitka i značajnim smanjenjem poslovnih i neto gubitaka, za razliku od podsektora "352" gde je data tendencija prihoda praćena solidnim povećanjem poslovnog i značajnim smanjenjem poslovnih i neto gubitaka, ali smanjenjem neto dobiti za skoro 1/3 čime se umanjuje ocena kvaliteta profitne pozicije podsektora;

▪ kod podsektora "353" data tendencija prihoda praćena je blagim povećanjem poslovnog i značajnim smanjenjem poslovnog gubitka, ali i značajnim

smanjenem neto dobitka i povećanjem neto gubitaka, što doprinosi lošijoj oceni kvaliteta profitne pozicije podsektora.

Na osnovu prikazane analize, može se zaključiti da su profitna pozicija i kvalitet podsektora "351" relativno povoljniji, nego kod podsektora "352", a pogotovu kod podsektora "353" za koji možemo dati nepovoljnu ocenu profitne pozicije.

Tabela 4. Pregled pokazatelja likvidnosti i solventnosti u Republici Srbiji za sektor i podsektore energetike u Republici Srbiji za 2019–2020. i 2015–2019. godinu

Kategorije	Koeficijent perspektivne likvidnosti (opšti racio likvidnosti)	Koeficijent trenutne likvidnosti (gotovinski racio likvidnosti)	Koeficijent efektivne likvidnosti (rigorozni racio likvidnosti)	Posečan period "gotov. ciklusa" (u dan.)	Posečno vreme naplate potraž. (u dan.)	Posečno vreme plaćanja dobavlj. (u dan.)	Vreme obrta zaliha (u dan.)	Solventnost (dinamički pokazatelj)	Zaduženost
"351" (2019)	0,89	0,14	0,70	166,92	73,79	109,28	202,41	3,94	0,35
"351" (2020)	0,89	0,14	0,70	195,05	84,04	112,20	226,21	6,69	0,35
Stopa +/- 2019/2020	0,00	-0,05	-0,01	0,17	0,10	0,03	0,12	0,70	-0,02
Prosečna stopa +/- 2015/2019	1,02	0,21	0,83	144,07	87,70	114,99	171,35	5,21	0,32
"352" (2019)	0,76	0,02	0,43	61,61	37,76	87,64	111,49	2,86	0,43
"352" (2020)	0,65	0,19	0,46	8,75	38.94	110,43	80,24	5,16	0,42
Stopa +/- 2019/2020	-0,14	9,75	0,06	-0.86	0,03	0,26	-0,28	0,81	-0,03
Prosečna stopa +/- 2015/2019	0,34	0,01	0,22	2,16	68,03	145,53	79,66	5,06	0,82
"353" (2019)	0,50	0,10	0,40	153,35	78,31	280,69	355,73	4,32	0,39
"353" (2020)	0,45	0,04	0,33	276.45	76,41	264,76	464,80	5,15	0,37
Stopa +/- 2019/2020	-0,10	-0,60	-0,17	0,80	-0,02	-0,06	5,15	0,19	-0,06
Prosečna stopa +/- 2015/2019	0,50	0,13	0,42	203,33	81,09	275,74	0,37	5,35	0,52

Izvor: Istraživanje autora

Analizom dobijenih rezultata iz *Tabele 4* je moguće istaći sledeće ocene:
▪ Prosečne vrednosti koeficijenta opšte likvidnosti preduzeća u analiziranim podsektorima pokazuju da su daleko od njene poželjene teorijske norme (≥2) što implicira ugroženost uslova za održanje likvidnosti. Značajniji pad vrednost pokazatelja je kod podsektora "352" i "353", a data vrednost kod podsektora "353" je niža od njegove prosečne vrednosti za period 2015–2019. godine;
▪ Prosečne vrednosti koeficijenta ubrzane likvidnosti preduzeća u analiziranim sektorima Republici Srbiji pokazuje da su manja od poželjene teorijske norme (≥1) što implicira da preduzeća nemaju dovoljno brzo unovčive imovine za izmirenje kratkoročnih obaveza. Najznačajnija promena je pad vrednost

pokazatelja je kod podsektora "353", a data vrednost kod podsektora "353" je niža od njegove prosečne vrednosti za period 2015–2019. godine;

▪ Prosečne vrednosti koeficijenta trenutne likvidnosti preduzeća u analiziranim podsektorima Republici Srbiji u kontekstu datih vrednosti koeficijenata opšte i ubrzane likvidnosti impliciraju da preduzeća nemaju dovoljno brzo unovčive imovine za izmirenje kratkoročnih obaveza.

Dalji razvoj analize, upotpunjujemo nalazima vrednosti dinamičkih pokazatelja likvidnosti radi celovitijih zaključaka o likvidnosti analiziranih podsektora, a moguće je primetiti da je došlo do produženja perioda gotovinski ciklusa u podsektorima "351" i "353", a do značajnog smanjena u podsektoru "352":

▪ Produženje gotovinskog ciklusa u podsektorima "351" i "353" je zbog negativnog uticaja produženje perioda naplate potraživanja i obrta zaliha, a koje je praćeno značajnim produženjem perioda isplate dobavljača koji je iznad perioda prosečnog trajanja gotovinskog ciklusa za period 2015–2019. godine;

▪ Analizom strukture elementa gotovinskih ciklusa u podsektoru "352" da se uočiti značajno smanjenje perioda gotovinskog ciklusa na šta je uticalo smanjenje perioda obrta zaliha koje je praćeno produženjem perioda isplate dobavljača, ali u 2020. godini je i dalje duži period trajanja gotovinskog ciklusa u odnosu na prosek za period 2015–2019. godine;

▪ Vrednost pokazatelja zaduženosti u analiziranim podsektorima ima tendenciju smanjenja u 2020. prema 2019. godini, a posebno primetno u podsektoru "352" značajno niže od njegove prosečne vrednosti za 2015–2019. godinu, što ukazuje na prevagu finansiranja iz sopstvenih u odnosu na tuđe izvora i sticanje uslova za povoljnu ocenu dužničke pozicije;

▪ Vrednost pokazatelja dinamičke solventnosti ima tenedenciju povećanja u 2020. u odnosu na 2019. godinu, njene vrednosti impliciraju solidnu, a kod podsektora „353" i poželjnu finansijsku moć grupe analiziranih preduzeća. Može se zaključiti da vrednosti analiziranih pokazatelja nisu ni blizu poželjnih normi likvidnosti, a da je u 2020. godini značajniji pad vrednost pokazatelja kod podsektora "352" i "353" što implicira respektivno i nepovoljnu ocenu pozicije likvidnosti, posebno za podsektor "353". Datu ocenu likvidnosti potvrđuje i tendencija produženja perioda gotovinskog ciklusa kod podsektora "351" i "353" pretežno na teret period trajanja zaliha, dok je kod podsektora "352" došlo do skraćenja gotovinskog ciklusa jer su date promene praćene intezivnijim produženjem perioda isplate dobavaljača. Kod svih podsektora postoji tendencija smanjenja pokazatelja zaduženosti, a koja je praćena jačanjem finansijske moći.

Da bismo u okviru sektora D – Proizvodnja i snabdevanje električnom energijom, gasom i vodom i njegovih podsektora, dalje ispitali uticaj nezavisnih varijabli u vremenskom periodu pre Covid 19-a na stopu povrata aktive (eng.Return on Assets - ROA) u ovom istraživanju koristimo sledeće nezavisne varijable:

Koeficijent tekuće likvidnosti (opšti racio likvidnosti), Koeficijent trenutne likvidnosti (novčani racio likvidnosti), Koeficijent ubrzane likvidnosti (rigorozni racio likvidnosti), Solventnost (dinamički pokazatelj) i Zaduženost. Zavisna varijabla je Stopa povrata aktive (eng. ROA). U *Tabeli 5*, „R" predstavlja vrednost koeficijenta višestruke korelacije koji se koristi za određivanje kvaliteta predviđanja zavisne varijable, u ovom slučaju ROA. Vrednost od 0,748 predstavlja dobar nivo predviđanja. Kolona „R kvadrat" predstavlja koeficijent odlučivanja, odnosno odnos disperzije zavisne varijable koji se može objasniti nezavisnim varijablama, odnosno 56% varijabilnosti zavisne varijable koja se može objasniti nezavisnim varijablama.

Tabela 5. Rezultati modela

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0,748	0,560	0,403	0,02723

Izvor: Istraživanje autora

F-vrednost u *Tabeli 6*, testira da li je regresioni model dobar. Iz prikazane tabele uočava se da nezavisne varijable statistički dobro predviđaju zavisnu varijablu (Sig. = 0,028) i to zapravo znači da je naš regresioni model dobar F =3.560, p <0,05.

Tabela 6. Test regresionog modela

ANOVA[a]					
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	0,013	5	0,003	3.560	0,028
	Residual	0,010	14	0,001		
	Total	0,024	19			

Izvor: Istraživanje autora

Iz *Tabele 7* za period 2015–2019. godine koeficijent trenutne likvidnosti β = 0,635, p= 0,012) i ubrzane likvidnosti (β = -0,299, Sig. = 0,001) dali su statistički značajnu predikciju Stope povrata aktive (ROA) pre Covid-19.

Tabela 7. Vrednosti koeficijenata modela

Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	0,163	0,053		3,089	0,008

Koeficijent tekuće likvidnosti (opšti racio likvidnosti)	-0,004	0,024	-0,034	-0,176	0,863
Koeficijent trenutne likvidnosti (novčani racio likvidnosti)	0,635	0,220	1,405	2,882	0,012
Koeficijent ubrzane likvidnosti (rigorozni racio likvidnosti)	-0,299	0,075	-2,033	-3,985	0,001
Solventnost (dinamički pokazatelj)	-0,002	0,005	-0,114	-0,452	0,658
Zaduženost	-0,087	0,056	-0,561	-1,554	0,142

Izvor: Istraživanje autora

Da bismo dalje, u okviru sektora D – Proizvodnja i snabdevanje električnom energijom, gasom i vodom i njegovih podsektora, ispitali uticaj nezavisnih varijabli, u vremenskom periodu 2020. godine, u toku Covid 19 pandemije na stopu povrata aktive (eng. ROA) u našem istraživanju koristimo već pomenute sledeće nezavisne varijable: Koeficijent tekuće likvidnosti (opšti racio likvidnosti), Koeficijent trenutne likvidnosti (novčani racio likvidnosti), Koeficijent ubrzane likvidnosti (rigorozni racio likvidnosti), Solventnost (dinamički pokazatelj) i Zaduženost. Zavisna varijabla je Stopa povrata aktive.

Tabela 8. Rezultati modela

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0,963	0,928	0,892	0,00315

Izvor: Istraživanje autora

U *Tabeli 8*, „R" predstavlja vrednost koeficijenta višestruke korelacije koji se koristi za određivanje kvaliteta predviđanja zavisne varijable, u ovom slučaju ROA. Vrednost od 0,963 predstavlja dobar nivo predviđanja. Kolona „R kvadrat" predstavlja koeficijent odlučivanja, odnosno odnos disperzije zavisne varijable koji se može objasniti nezavisnim varijablama, odnosno 92,8% varijabilnosti zavisne varijable koja se može objasniti nezavisnim varijablama.

Tabela 9. Test regresionog modela

ANOVA[a]						
	Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	0,000	1	0,000	25.756	0,037[b]
	Residual	0,000	2	0,000		
	Total	0,000	3			

Izvor: Istraživanje autora

F-vrednost u *Tabeli 9*, testira da li je regresioni model dobar. Ova tabela pokazuje da nezavisne varijable statistički dobro predviđaju zavisnu varijablu (Sig. = 0,037) i to zapravo znači da je naš regresioni model dobar F = 25.756, p <0,05.

Tabela 10. Vrednosti koeficijenata modela

Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	0,047	0,006		7,781	0,016
	Koeficijent ubrzane likvidnosti (rigorozni racio likvidnosti)	-0,057	0,011	-0,963	-5,075	0,037

Izvor: Istraživanje autora

Na osnovu rezultata prikazanih u *Tabeli 10* primećuje se da u toku Covid-19 pandemije koeficijent ubrzane likvidnosti (β = -0,057, Sig.= 0,037) daje statistički značajnu predikciju Stope povrata aktive (ROA).

Zaključak

Sektor D - Proizvodnja i snabdevanje električnom energijom, gasom i vodom nezaobilazna je kategorija industrijske delatnosti, a kako čini skoro petinu industrijskih aktivnosti smatra se jednom od najvažnijih i najpouzdanijih komponenti ukupne privredne aktivnosti u Srbiji. Rad predstavlja jedno od malobrojnih istraživanja koje se bavi pitanjem finansijske vitalnosti (faktora likvidnosti, solventnosti i profitabilnosti) ovog sektora u vremenu Covid-19 u Republici Srbiji. Rezultati istraživanja pokazuju da je profitna pozicija na nivou Sektora D solidna, i pored neznatne oscilacije prihoda, a koja je praćena solidnim povećanjem poslovnog i neto dobitka, odnosno kvalitetom prihoda. Kada je u pitanju finansijska pozicija, i pored značajnog rizika po održanje likvidnosti, faktori likvidnosti su bolji nego u prethodnom petogodišnjem periodu.

Analiza je otkrila razlike u profitu i finansijskoj poziciji podsektora, koje pokazuju da uticaj pandemije nije uticao na sve podsektore podjednako, a da su su najveći rizici po finansijsku vitalnost u podsektoru 353 – Snabdevanje parom i klimatizacija. Regresionom analizom ispitan je i uticaj likvidnosti i solventnosti na stopu povrata aktive. Rezultati ukazuju da koeficijent ubrzane likvidnosti daje statistički značajnu predikciju stope povrata aktive i u periodu pre Covid-19 i u toku Covid-19 pandemije. Stoga se racionalnim čini nastaviti istraživanje analizom uticaja na grane i grupe delatnosti, a prvenstveno uvažavajući veličinu i profil analaziranih preduzeća, uključivanjem uticaja i drugih ekonomskih determinanti.

Literatura

1. Čavlin M., J. Vapa Tankosić, V. Miletić, & M. Ivaniš. 2021. Analysis of the impact of liquidity on the profitability of assets of medium and large enterprises in the meat production activity of the Republic of Serbia. Economics of Agriculture 68, (3): 789–803. ISSN 2334-8453. https://doi.org/10.5937/ekoPolj2103789C.

2. Čavlin M., J. Vapa-Tankosić, & S. Egić 2021. Perspektive sistema zaštite finansijske stabilnosti i prevencije rizika bankarskog poslovanja. Ekonomija – Teorija i praksa XIV, (3): 109–126. ISSN 2217-5458, https://doi.org/105937/etp2103109Q.

3. Eurostat. Preuzeto sa www. https://ec.europa.eu/eurostat (11.3.2022).

4. Ivanović P. 2020. Upravljanje rizicima i kapitalom u bankama. Beogradska Bankarska Akademija, Beograd. ISBN 978-86-7852-049-5.

5. Lekić S., Z. Davidovac, & N. Lekić. 2021. Menadžment. Beogradska akademija poslovnih i umetničkih strukovnih studija, Beograd. ISBN 978-86-7169-609-8.

6. Malešević Đ., & M. Čavlin. 2009. Sistem racio analize u procesu upravljanja preduzećem u kriznom okruženju, Zbornik radova – 13. kongres – tema: Računovodstvo, revizija i finasije u uslovima globalne krize – Savez računovođa i revizora Republike Srpske, Savez računovođa i revizora Republike Srpske, Teslić, str. 213–234.

7. Malešević Đ., & M. Čavlin. 2020. Poslovna analiza. FIMEK, Novi Sad.

8. Marjanović D., & M. Đukić. 2020. Ekonomske mere za ublažavanje posledica COVID-19 (str. 91-105). In: Mitić P.; Marjanović D. [ur.] Black swan in the world economy 2020, Institut ekonomskih nauka, Beograd. ISBN 978-86-89465-54-9

9. Marković A., & V. Krmpot. 2014. Holističko-sistemski pristup upravljanju promenama. Ekonomika 60, (3): 149–160. ISSN 0350-137X

10. Osmanagić–Bedenik N. 2003. Kriza kao šansa: kroz poslovnu krizu do poslovnog uspjeha. Školska knjiga, Zagreb. ISBN 953-0-30338-6

11. Radović-Marković M., & H. Hanić. 2018. Metodologija istraživanja u ekonomskim naukama. Beogradska bankarska akademija, Fakultet za bankarstvo, osiguranje i finansije, Institut ekonomskih nauka, Beograd.

12. Republički zavod za statistiku. Preuzeto sa: https://www.stat.gov.rs/ (10.01.2022).

13. Rosner B. 2011. Fundamentals of Biostatistics. 7th Edition. Brooks/Cole, Cengage Learning, Boston. ISBN 978-0-538-73349-6

14. Tintor J. 2009. Poslovna analiza. Masmedia, Zagreb. ISBN 978-953-157-528-7.

15. Vapa Tankosić J., M. Čavlin, & Đ. Buđevac. 2020. Analiza mera centralnih banaka za ublažavanje monetarnih i finansijskih rizika izazvanih Kovid-19, U: Tranzicija u 21. veku (str. 134-146). Kragujevac: Institut primenjenih

nauka Beograd, Centar za održivi razvoj Beograd, Visoka škola za menadžment i ekonomiju Kragujevac, Univerzitet za Poslovne studije Banja Luka.

ANALYSIS OF RISK FACTORS OF THE FINANCIAL AND PROFIT POSITION WITH THE OBJECTIVE OF IMPROVING THE VITALITY OF THE ENERGY SECTOR

Miroslav Čavlin [9], Jelena Vapa-Tankosić, [10]Zoran Davidovac, [11]Ivaniš Miloš[12]

Original scientific paper

Abstract

This paper deals with the research of the risk of the profit and financial position of the energy industry in the period of Covid-19, i.e. sector D - Production and supply of electricity, gas and water subsector 351 - Production, transmission and distribution of electricity, 352 - Production of gas and distribution of gaseous fuels gas pipelines and 353 - Steam supply and air conditioning through selected indicators for the year 2020 compared to the previous year 2019, and evaluates them in relation to the average five-year achievements. Further analysis by sub-sectors revealed differences in the assessment of financial and profit positions by sub-sectors in relation to sectoral assessments. The results of the research show that, in the short term, no worsening of the risk factors of the profit and financial position was observed, based on the annual balance statements of the analyzed categories, at the level of the energy sector as a whole. Regression analysis also examined the influence of liquidity and solvency parameters on the rate of return on assets in the period before Covid-19 and during the Covid-19 pandemic.

Keywords: liquidity, solvency, energy, Republic of Serbia, Covid-19 pandemic.

JEL: G32, M40

Introduction

The question of the vitality of a modern company, as a feature of the whole, does not mean meeting the minimum business conditions, but much more than that - maintaining full business strength ("life"). Of course, by strengthening vitality they improve looks like For permanently strengthening the company's

---

[9] Full professor, Faculty For economy and engineer management, Cvećarska Street no. 2, 21000 Novi Sad, Serbia, - mail: cmiros@gmail.com

[10] Full professor, Faculty For economy and engineer management, Cvećarska Street no. 2, 21000 Novi Sad, Serbia, - mail: jvapa@gmail.com

[11] Assistant with PhD, Belgrade Academy of Business and Art Vocational Studies, Department of Business and Information Studies, Kraljice Marije no. 73, 11050 Belgrade, Serbia, - mail: zoran.davidovac@bpa.edu.rs

[12] Doctoral student Faculty For economy and engineer management, Cvećarska Street no. 2, 21000 Novi Sad, Serbia, E-mail: mivanis97@gmail.com

achievements, in a holistic context, and thus financial achievements. Financial vitality focuses on ability maintenance dynamics of equality in relationship on the variables external factors business, and simultaneously in relationship on the internal factors business, while integrally looking at issues of liquidity and adequacy source financing and property, generation profit and values For owners and other stakeholders. In this connection, the key importance of the analysis of the financial and profit position for the maintenance of the financial vitality of the company is emphasized, that is, more specifically, the question of the analysis of the categories of liquidity and profit. Liquidity represents the primary measure of the survival or disappearance of the company, and profit is the traditional, primary measure of the maintenance and growth of the company.

The subject of this study will look at the issue of financial vitality of industrial companies in sector D - Production and supply of electricity, gas and water in the Republic of Serbia, in the period and business conditions affected by the Covid-19 pandemic, with an emphasis on insufficiently researched problems of financial vitality, i.e. profit and financial positions as a strong and significant instrument of competitive ability, which affects the overall economic development of the country. The research is structured as follows: the first part of the research describes the importance of the financial vitality of companies in the modern economy; the second part of the research includes the methodology for analyzing the existing indicators for 2020 in relation to the previous year 2019, and evaluating them with the average five-year achievements within sector D - Production and supply of electricity, gas and water subsector 351 - Production, transmission and distribution of electricity; 352 - Gas production and distribution of gaseous fuels through gas pipelines and 353 - Steam supply and air conditioning; the third part of the research deals with the analysis of the obtained results; in the fourth part of the research, knowledge will be sublimated in order to improve financial vitality.

Literature review

The modern meaning of the existence and operation of a company as a complex is expressed as follows: "the economic meaning of business is the production of value and the increase of wealth as capital, increasing the capacity for business activity or increasing assets, knowledge and skills, but also as improving relations between people for the sake of capital, property, acquiring knowledge and skills, and living conditions" (Tintor, 2009, p. 159). Therefore, business decisions can no longer be focused only on goals; they must tend towards a holistic context. A holistic context for a company is a context that includes all goals and actions that lead to the realization of the vision, that is, the mission for which the company was initially founded (Marković and Krmpot, 2014).

"Liquidity represents the most important, but also the first emerging short-term management quantity, which determines the existence or non-existence of the

possibility of survival of entrepreneurs (enterprises), above all, financial trust among business partners - on the contrary, survival or bankruptcy" (Malešević and Čavlin, 2020, p. 56). The increasingly rapid development of financial products and instruments on the financial market, which were in the function of diversification and risk transfer in the relationship between the financial and the real sector, influenced investors to pay more attention to understanding and managing the risks they are exposed to (Ivanović, 2020). No company is spared from the crisis, and successful crisis management implies (Osmanagić−Bedenik, 2003):

d) anticipatory crisis management, i.e. preventive action, crisis prevention (introduction of precautionary measures, prevention);
e) identification of the crisis (has it occurred, how to recognize it, what is its strength?);
f) reactive crisis management, i.e. crisis management (what to do in order to successfully "get out" of the crisis?).

Crisis management follows all stages of crisis development, tries to act preventively, and in the last case acts when the crisis has already occurred. With the crisis phases, namely, the pressure to act increases, while at the same time the room for maneuver required for rehabilitation and restructuring decreases. The more advanced the process of the company's decline, the weaker the prospects for its recovery. Crisis management helps in avoiding business crisis and precautionary measures, i.e. by preventive action, it mitigates the consequences of the crisis - reactively, depending on the cause and stage of the development of the crisis (Malešević and Čavlin, 2020, p. 75). Strategic controlling is focused on the actions of employees with the purpose of achieving the company's profit, increasing its vitality and improving its opportunities for lasting success. At the same time, the vitality of the company is considered (Malešević and Čavlin, 2020, p.76):

▪ "as the ability to adapt (actively and reactively) and
▪ the ability to progress (preserving and developing identity through experience and learning), and in order to ensure vitality in today's crisis environment, the company must react, based on the inclusion of comprehensive information resources, and understand disturbances, and identify causes for timely and purposeful therapy to eliminate the crisis ".

Therefore, the following activities are performed within the framework of strategic controlling: "analysis of strengths and weaknesses of the organization, analysis of organizational potentials, analysis of the environment, analysis of the life cycle of products/services." Break-even analysis, return-on-investment analysis and analysis of the organization's image" (Lekić, Davidovac and Lekić, 2021, p. 256).

Global markets are facing one of the most severe pandemics in modern history. All over the world, financial markets are in serious difficulties, the consequences of which have begun to spill over into the real sector as well. The countries that are most affected by the crisis are those that depend to a large extent on tourism, transport and other economic activities, and which are most affected by measures to limit movement (Marjanović and Đukić, 2020). EU industrial production in 2020 decreased by 7% compared to 2019 due to the Covid-19 pandemic, while more than 75% of EU production value took place in six member states: Germany (29% of the total number of member states of the EU), Italy (18%), France (12%), Spain (9%), Poland (5%) and the Netherlands (3%) (Eurostat, www. https://ec.europa.eu/eurostat /). Governments, central banks and regulatory bodies are trying to boost liquidity in the market, introducing new monetary and financial measures, as well as tax relief as Covid-19 has caused sharp contractions in economic development, reduced liquidity and difficult access to capital. Research results indicate that central banks have turned to unconventional monetary measures such as lowering interest rates and required reserves for banks, easing collateral requirements, increasing the volume of repo operations and swap arrangements, as well as quantitative easing programs (Čavlin, Vapa Tankosić and Egić, 2021; Vapa Tankosić, Čavlin and Buđevac, 2020).

Observed by activities, in the Republic of Serbia the most significant participation in the formation of GDP in 2020 was: the manufacturing industry sector (13.3%), the wholesale and retail trade and motor vehicle repair sector (11.3%), the business sector real estate (7.0%), the agriculture, forestry and fishing sector (6.3%), the information and communication sector (5.4%) and the construction sector (5.4%). Sector D - Production and supply of electricity, gas and water accounted for 3.2% of the GDP in 2020, while its real growth rate in the same year was 0.9%. Revenue of RSD 177,420 million was realized in that sector, which represents a slight decrease in relation to the income from 2019, when it totaled RSD 171,978 million (Republički zavod za statistiku, https://www.stat.gov.rs/).

Therefore, this paper aims to study the issue of maintaining financial vitality Sector D - Production and supply of electricity, gas and water, bearing in mind the existing crisis conditions that caused disruptions in international exchange and transport, the price of energy, food, in the context of its importance for the vitality of the Serbian economy.

Methodological research framework

For the purposes of the research, a sample of companies was formed that were classified into areas of activity by business structural statistics of the Republic of Serbia Statistics Institute. and the indicators are derived from publicly available information, i.e. official financial reports, which the companies in question

submitted to the Agency for Economic Registers of the Republic of Serbia, and from direct inspection of the company's reports. According to the available data from the total number of companies that prepared and submitted annual financial reports, and for the purposes of the research, taking into account the criteria of activity, a sample was formed and relevant data was collected for the period 2019-2020. Mr. Odin.

An analysis of the liquidity of industrial activity by sector and area was performed using selected indicators for 2020 compared to the previous year, and the representativeness of average values was identified using descriptive statistical methods on the example of current liquidity indicators of sector D - Production and supply of electricity, gas and water subsector 351 - Production, transmission and distribution of electricity; 352 - Gas production and distribution of gaseous fuels through gas pipelines and 353 - Steam supply and air conditioning. In the following text, the corresponding letter designations will be used for sectors, and the corresponding numerical designations for subsectors.

In this research, regression analysis of the influence of two or more explanatory variables on the dependent variable will be used, ie. multiple or multiple regression. With this regression, we determined how many percent of the variability of the dependent variable was explained by a certain set of independent variables and what was the relative contribution of each independent variable included in the regression analysis. Multiple logistic regression is a statistical method based on which the influence of several independent factors on one dependent factor is examined (Rosner, 2011; Radović-Marković and Hanić, 2018):

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k + \varepsilon$$

where are they:

$x_1, x_2, \ldots, x_k$ n independent (explanatory) variables or predictors

$\beta_0, \beta_1, \beta_2, \ldots, \beta_k$ regression coefficients or regression parameters

ε stochastic term or random error that includes the effects of all other variables (except the variable $x_1, x_2, \ldots, x_k$) that are not directly included in the regression model.

Within sector D - Production and supply of electricity, gas and water and its sub-sectors, in order to examine the influence of independent variables (liquidity and solvency parameters) in the period before Covid-19 (2015-2019) and during the Covid-19 pandemic (2020) on the rate of return on assets by regression analysis. The authors took as independent variables: Current liquidity ratio (general liquidity ratio), Current liquidity ratio (cash liquidity ratio), Accelerated liquidity ratio (rigorous liquidity ratio), Solvency (dynamic indicator) and Indebtedness.

The dependent variable is the Rate of Return on Assets. The statistical software package SPSS was used to analyze the data of this paper.

Results and Discussion

The sample includes companies from Sector D and its sub-sectors, and we begin the research with an analysis of the profit and financial position at the level of the entire Sector D. The results of the research are shown in *Table 1*.

Table 1. Dynamics of business income, business and net profit / loss within sector D - Production and supply of electricity, gas and water in the Republic of Serbia for 2019-2020. and 2015-2019 _

Categories	D - Supply of electricity, gas, steam and air conditioning (2019)	D - Supply of electricity, gas, steam and air conditioning (2020)	Rate +/- 2019/2020	Average rate +/- 2015/2019
Business income	620,730,391.00	609,931,925.00	-0.02	-0.01
Operating profit	34,528,345.00	41,291,691.00	0.20	-0.07
Business loss	9,714,309.00	4,056,194.00	-0.58	0.49
Net gain	22,532,708.00	23,112,619.00	0.03	0.04
Net loss	18,565,905.00	6,312,841.00	-0.66	0.37

Source: Author's research

By analyzing the obtained results from *Table 1,* it is possible to highlight the following grades:

- looking at 2019–2020. year at the level of sector D, the drop in income was insignificant (2%) and
- in the case of sector D, the given tendency of income oscillation is accompanied by a solid increase in business and net profit, and a significant decrease in business and net losses, the quality of which is even more significant when compared to the average rate of growth of business and net profit and the average rate of decrease in business and net losses for the period 2015–2019. years.

We can conclude that the profit position and quality of Sector D were stable in the observed period.

Table 2. Overview of indicators of liquidity and solvency in the Republic of Serbia within sector D - Production and supply of electricity, gas and water in the Republic of Serbia for 2019-2020. and 2015–2019. A year

Categories	D - Supply of electricity, gas, steam and air conditioning (2019)	D - Supply of electricity, gas, steam and air conditioning (2020)	Rate +/- 2019/2020	Average rate +/- 2015/2019
Prospective liquidity ratio (general liquidity ratio)	0.81	0.78	-0.04	0.69
Current liquidity ratio (cash liquidity ratio)	0.11	0.13	0.20	0.13
Effective liquidity ratio (rigorous liquidity ratio)	0.61	0.60	-0.01	0.55
Average "cash cycle" period (in days)	112.57	115.40	0.03	90,81
Average claim collection time (in days)	68.20	73,79	0.08	84.05
Average payment time to suppliers (in days)	119.66	124.57	0.04	133.26
Inventory Turnover Time (in days)	164.03	166.17	0.01	140.02
Solvency (dynamic indicator)	3.70	6.05	0.64	4.95

Source: Author's research

By analyzing the obtained results from *Table 2,* it is possible to derive the following ratings:

▪ The average values of the coefficient of general liquidity of companies at the level of Sector D in the Republic of Serbia are significantly lower than the desired theoretical norm (≥2), which implies a threat to the conditions for maintaining liquidity, with the fact that there is a slight decrease compared to the previous year, as well as noticeably lower values from the average values for the period 2015–2019. years;

▪ The average values of the coefficient of accelerated liquidity of companies in the analyzed sector in the Republic of Serbia show that they are lower than the desired theoretical norm (≥1), which implies that companies do not have enough

quickly liquid assets to settle short-term obligations. The growth of the indicator value is minimal in sector D compared to the previous year, and the given value is higher than its average value for the period 2015–2019. years;

- The average values of the coefficient of the current liquidity of companies in the analyzed sector in the Republic of Serbia in the context of the given values of the coefficients of general and accelerated liquidity imply that companies do not have enough quickly liquid assets to settle short-term obligations;

- Further development of the analysis, we complete the results of the values of dynamic liquidity indicators for more complete conclusions about the liquidity of the analyzed sector, and it is possible to notice that there was an extension of the period of the cash cycle;

- Analyzing the structure of the cash cycle element of Sector D, it can be seen that the cash cycle lengthened by 3.00%, and that the decisive negative impact is the lengthening of the receivables collection period, then the stock turnover period, which is followed by the lengthening of the supplier payment period, with a noticeably longer the duration of the cash cycle compared to the average in the period 2015–2019. years;

- The indebtedness indicator as a ratio of total liabilities (short-term and long-term) and total assets shows how much the company is financed from other sources, i.e. from other people's capital. The larger the indicator, the more indebted the company is and the greater the risk of investing in the company itself. The preferred experiential norm is that the debt ratio does not exceed the value of 0.5, because the company should prefer financing from its own sources to the account from other sources. The values of the indebtedness indicator in Sector D are lower than 0.5 and show the predominance of own financing in relation to other sources. In Sector D, there was a slight decrease in the level of indebtedness in 2020 compared to 2019, and just below its average for 2015-2019. a year.

- Experiential norms in practice indicate that a higher value of the indicator of interest cost coverage (dynamic solvency) is better, so a value of 3-7 is considered solid, and over 7 is desirable. The presented results of interest cost coverage show significant differences in financial power, i.e. the degree of generation of operating cash for loan interest payments. The indicator of dynamic solvency of Sector D increased by almost 2/3 in 2020 compared to 2019, and at the same time above its average for the period 2015 - 2019, which implies solid financial strength. In Sector D, there is a tendency to extend the period of the cash cycle due to the dominance of the average age of customers and inventory, as well as a slight improvement in the degree of indebtedness, which is accompanied by the strengthening of financial power. We develop further analysis by analyzing three subsectors in the energy sector.

-

Table 3. Dynamics of business income, business and net profit / loss for the energy sector and sub-sectors in the Republic of Serbia for 2019-2020. and 2015-2019 _

Categories	Business income	Operating profit	Business loss	Net gain	Net loss
"351" (2019)	462,774,261.00	23,807,470.00	7,513,243.00	6.311.409.00	9,447,849.00
"351" (2020)	457,724,605.00	26,602,201.00	3,549,615.00	15,672,906.00	3,338,818.00
Rate +/- 2019/2020	-0.01	0.12	-0.53	1.48	-0.65
Average rate +/- 2015/2019	-0.01	0.03	0.52	-0.21	0.27
"352" (2019)	103,167,573.00	6,855,212.00	1,345,774.00	5,137,704.00	8,573,784.00
"352" (2020)	99,118,546.00	10,559,662.00	16,434.00	3,647,094.00	1,740,148.00
Rate +/- 2019/2020	-0.04	0.54	-0.99	-0.29	-0.80
Average rate +/- 2015/2019	0.04	-0.11	2.78	1.18	8.19
"353" (2019)	54,788,557.00	3,865,663.00	855,292.00	11,083,595.00	544,272.00
"353" (2020)	53,088,774.00	4,129,822.00	490,145.00	3,792,619.00	1,233,875.00
Rate +/- 2019/2020	-0.03	0.07	-0.43	-0.66	1.27
Average rate +/- 2015/2019	-0.01	0.03	0.25	0.49	-0.10

Source: Author's research

We continue further research by analyzing the profit and financial position by sub-sectors "351", "352" and "353" of Sector D, and by analyzing the obtained results from *Table 3,* it is possible to highlight the following ratings:

- in three sub-sectors, there was a decrease in business income in 2020 compared to 2019, with the fact that in sub-sectors "352" and "353" there is a slightly greater decrease compared to sub-sector "351", which is insignificant (1%).
- in sub-sector "351" the given tendency of income oscillation is followed by a solid increase in business and net profit and a significant decrease in business and net losses, in contrast to sub-sector "352" where the given tendency of income is followed by a solid increase in business and a significant decrease in business and net losses, but by reducing the net profit by almost 1/3, which lowers the quality rating of the subsector's profit position;
- in sub-sector "353" the given income tendency is followed by a slight increase in business and a significant decrease in business loss, but also a significant

decrease in net profit and an increase in net losses, which contributes to a worse assessment of the quality of the profit position of the sub-sector.

Based on the presented analysis, it can be concluded that the profit position and quality of sub-sector "351" are relatively more favorable than that of sub-sector "352", and especially of sub-sector "353", for which we can give an unfavorable assessment of the profit position.

Table 4. Overview of liquidity and solvency indicators in the Republic of Serbia for the energy sector and sub-sectors in the Republic of Serbia for 2019-2020. and 2015–2019. a year

Categories	Prospective liquidity ratio (general liquidity ratio)	Current liquidity ratio (cash liquidity ratio)	Effective liquidity ratio (rigorous liquidity ratio)	The special period "over. cycle" (in day.)	Please ask for a special billing time. (in the day.)	Special payment time provided. (in the day.)	Stock turnover time (in days)	Solvency (dynamic indicator)	Indebtedness
"351" (2019)	0.89	0.14	0.70	166.92	73,79	109.28	202.41	3.94	0.35
"351" (2020)	0.89	0.14	0.70	195.05	84.04	112.20	226.21	6.69	0.35
Rate +/- 2019/2020	0.00	-0.05	-0.01	0.17	0.10	0.03	0.12	0.70	-0.02
Average rate +/- 2015/2019	1.02	0.21	0.83	144.07	87.70	114.99	171.35	5.21	0.32
"352" (2019)	0.76	0.02	0.43	61,61	37.76	87.64	111.49	2.86	0.43
"352" (2020)	0.65	0.19	0.46	8.75	38.94	110.43	80.24	5,16	0.42
Rate +/- 2019/2020	-0.14	9.75	0.06	-0.86	0.03	0.26	-0.28	0.81	-0.03
Average rate +/- 2015/2019	0.34	0.01	0.22	2.16	68.03	145.53	79.66	5.06	0.82
"353" (2019)	0.50	0.10	0.40	153.35	78,31	280.69	355.73	4.32	0.39
"353" (2020)	0.45	0.04	0.33	276.45	76.41	264.76	464.80	5.15	0.37
Rate +/- 2019/2020	-0.10	-0.60	-0.17	0.80	-0.02	-0.06	5.15	0.19	-0.06
Average rate +/- 2015/2019	0.50	0.13	0.42	203.33	81.09	275.74	0.37	5.35	0.52

Source: Author's research

By analyzing the obtained results from *Table 4,* it is possible to highlight the following grades:

▪ The average values of the general liquidity coefficient of companies in the analyzed sub-sectors show that they are far from its desired theoretical norm (≥ 2), which implies a threat to the conditions for maintaining liquidity. Subsectors "352" and "353" saw a more significant drop in the value of the indicator, and the given value for subsector "353" is lower than its average value for the period 2015-2019. years;

- The average values of the coefficient of accelerated liquidity of companies in the analyzed sectors of the Republic of Serbia show that they are lower than the desired theoretical norm (≥1), which implies that companies do not have enough quickly liquid assets to settle short-term obligations. The most significant change is the decrease in the value of the indicator in subsector "353", and the given value in subsector "353" is lower than its average value for the period 2015-2019. years;
- The average values of the coefficient of current liquidity of companies in the analyzed sub-sectors of the Republic of Serbia in the context of the given values of the coefficients of general and accelerated liquidity imply that companies do not have enough quickly liquid assets to settle short-term obligations.

We complete the further development of the analysis with the findings of the values of dynamic liquidity indicators for the sake of more complete conclusions about the liquidity of the analyzed subsectors, and it is possible to notice that there was an extension of the cash cycle period in subsectors "351" and "353", and a significant decrease in subsector "352":

- The extension of the cash cycle in sub-sectors "351" and "353" is due to the negative impact of the extension of the receivables collection period and inventory turnover, which is accompanied by a significant extension of the supplier's payment period, which is above the period of the average duration of the cash cycle for the period 2015-2019. years;
- By analyzing the structure of the element of cash cycles in the sub-sector "352", it is possible to observe a significant reduction in the period of the cash cycle, which was influenced by the decrease in the period of inventory turnover, which was followed by the extension of the payment period of suppliers, but in 2020, the duration of the cash cycle is still longer compared to average for the period 2015–2019. years;
- The value of the indebtedness indicator in the analyzed sub-sectors has a tendency to decrease in 2020 compared to 2019, and is especially noticeable in the "352" sub-sector significantly lower than its average value for 2015-2019. year, which indicates the predominance of financing from own sources compared to other sources and the acquisition of conditions for a favorable assessment of the debt position;
- The value of the dynamic solvency indicator has a tendency to increase in 2020 compared to 2019, its values imply solid, and in the case of subsector "353" desirable financial power of the group of analyzed companies. It can be concluded that the values of the analyzed indicators are not even close to the desired liquidity norms, and that in 2020, the value of the indicators in the subsectors "352" and "353" is more significant, which implies respectively an unfavorable assessment of the liquidity position, especially for the subsector "353". The given liquidity assessment is confirmed by the tendency to extend

the period of the cash cycle in the sub-sectors "351" and "353", mainly at the expense of the inventory period, while in the sub-sector "352" there was a shortening of the cash cycle because the given changes were followed by a more intensive extension of the supplier's payment period. In all sub-sectors, there is a tendency to reduce indebtedness indicators, which is accompanied by a strengthening of financial power.

In order to further examine the influence of independent variables in the time period before Covid 19 on the rate of return on assets (eng. Return on Assets - ROA) within the sector D - Production and supply of electricity, gas and water and its sub-sectors, in this research we use the following independent variables: Current liquidity ratio (general liquidity ratio), Current liquidity ratio (cash liquidity ratio), Accelerated liquidity ratio (rigorous liquidity ratio), Solvency (dynamic indicator) and Indebtedness. The dependent variable is the rate of return on assets (ROA). In *Table 5,* "R" represents the value of the multiple correlation coefficient used to determine the quality of the prediction of the dependent variable, in this case ROA. A value of 0.748 represents a good level of prediction. The "R square" column represents the decision coefficient, i.e. the dispersion ratio of the dependent variable that can be explained by the independent variables, i.e. 56% of the variability of the dependent variable that can be explained by the independent variables.

Table 5. Model results

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the estimate**
1	0.748	0.560	0.403	0.02723

Source: Author's research

The F-value in *Table 6* tests whether the regression model is good. From the table shown, it can be seen that the independent variables predict the dependent variable statistically well (Sig. = 0.028) and this actually means that our regression model is good F =3.560, p <0.05.

Table 6. Regression model test

ANOVA [a]						
	Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	0.013	5	0.003	3,560	0.028
	Residual	0.010	14	0.001		
	Total	0.024	19			

Source: Author's research

From *Table 7* for the period 2015–2019. (current liquidity coefficient β = 0.635, p= 0.012) and accelerated liquidity (β = -0.299, Sig. = 0.001) gave a statistically significant prediction of the Return on Assets (ROA) rate before Covid-19.

Table 7. Values of model coefficients

Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	0.163	0.053		3,089	0.008
	Current liquidity ratio (general liquidity ratio)	-0.004	0.024	-0.034	-0.176	0.863
	Current liquidity ratio (money liquidity ratio)	0.635	0.220	1,405	2,882	0.012
	Accelerated liquidity ratio (rigorous liquidity ratio)	-0.299	0.075	-2,033	-3,985	0.001
	Solvency (dynamic indicator)	-0.002	0.005	-0.114	-0.452	0.658
	Indebtedness	-0.087	0.056	-0.561	-1,554	0.142

Source: Author's research

In order to further examine, within the framework of sector D - Production and supply of electricity, gas and water and its sub-sectors, the influence of independent variables, in the time period of 2020, during the Covid 19 pandemic, on the rate of return on assets (eng. ROA) in our for research we use the following independent variables already mentioned: Current liquidity ratio (general liquidity ratio), Current liquidity ratio (cash liquidity ratio), Accelerated liquidity ratio (rigorous liquidity ratio), Solvency (dynamic indicator) and Indebtedness. The dependent variable is the Rate of Return on Assets.

Table 8. Model results

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the estimate**
1	0.963	0.928	0.892	0.00315

Source: Author's research

In *Table 8,* "R" represents the value of the multiple correlation coefficient used to determine the quality of the prediction of the dependent variable, in this case ROA. A value of 0.963 represents a good level of prediction. The "R square" column represents the decision coefficient, that is, the dispersion ratio of the dependent variable that can be explained by the independent variables, that is,

92.8% of the variability of the dependent variable that can be explained by the independent variables.

Table 9. Regression model test

ANOVA [a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.000	1	0.000	25,756	0.037 [b]
	Residual	0.000	2	0.000		
	Total	0.000	3			

Source: Author's research

The F-value in *Table 9* tests whether the regression model is good. This table shows that the independent variables predict the dependent variable statistically well (Sig. = 0.037) and this actually means that our regression model is good $F = 25.756$, $p < 0.05$.

Table 10. Values of model coefficients

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.047	0.006		7,781	0.016
	Accelerated liquidity ratio (rigorous liquidity ratio)	-0.057	0.011	-0.963	-5,075	0.037

Source: Author's research

Based on the results shown in *Table 10,* it is observed that during the Covid-19 pandemic, the coefficient of accelerated liquidity ($\beta = -0.057$, Sig.= 0.037) gives a statistically significant prediction of the Return on Assets (ROA).

Conclusion

Sector D - Production and supply of electricity, gas and water is an indispensable category of industrial activity, and as it accounts for almost a fifth of industrial activity, it is considered one of the most important and reliable components of the total economic activity in Serbia. The paper represents one of the few researches that deals with the issue of financial vitality (liquidity, solvency and profitability factors) of this sector in the time of Covid-19 in the Republic of Serbia. The results of the research show that the profit position at the level of Sector D is solid, despite the slight fluctuation of income, which is accompanied by a solid increase in business and net profit, that is, the quality of income. When it comes to

the financial position, despite the significant risk of maintaining liquidity, liquidity factors are better than in the previous five-year period.

The analysis revealed differences in the profit and financial position of subsectors, which show that the impact of the pandemic did not affect all subsectors equally, and that the greatest risks to financial vitality are in subsector 353 - Steam supply and air conditioning. The influence of liquidity and solvency on the rate of return on assets was also examined through regression analysis. The results indicate that the coefficient of accelerated liquidity gives a statistically significant prediction of the rate of return on assets both in the period before Covid-19 and during the Covid-19 pandemic. Therefore, it seems rational to continue the research by analyzing the impact on branches and groups of activities, primarily respecting the size and profile of the analyzed companies, including the impact and other economic determinants.

Literature

1. Čavlin M., J. Vapa Tankosić, V. Miletić, & M. Ivaniš. in 2021 Analysis of the impact of liquidity on the profitability of assets of medium and large enterprises in the meat production activity of the Republic of Serbia. Economics of Agriculture 68, (3): 789–803. ISSN 2334-8453. https://doi.org/10.5937/ekoPolj2103789C.
2. Čavlin M., J. Vapa-Tankosić, & S. Egić 2021. Perspectives of the financial stability protection system and risk prevention of banking operations. Economics - Theory and Practice XIV, (3): 109–126. ISSN 2217-5458, https://doi.org/105937/etp2103109Q .
3. Eurostat. Retrieved from www. https://ec.europa.eu/eurostat (11 March 2022).
4. Ivanović P. 2020. Risk and capital management in banks. Belgrade Banking Academy, Belgrade. ISBN 978-86-7852-049-5.
5. Lekić S., Z. Davidovac, & N. Lekić. 2021. Management. Belgrade Academy of Business and Art Vocational Studies, Belgrade. ISBN 978-86-7169-609-8.
6. Malešević Đ., & M. Čavlin. 2009. System of ratio analysis in the process of managing a company in a crisis environment, Proceedings - 13th congress - topic: Accounting, auditing and finance in conditions of global crisis - Association of Accountants and Auditors of the Republic of Srpska, Association of Accountants and Auditors of the Republic of Srpska, Teslić, p. 213–234.
7. Malešević Đ., & M. Čavlin. 2020. Business analysis. FIMEK, Novi Sad.
8. Marjanović D., & M. Đukić. 2020. Economic measures to mitigate the consequences of COVID-19 (pp. 91-105). In: Mitić P.; Marjanović D. [ed.] Black swan in the world economy 2020, Institute of Economic Sciences, Belgrade. ISBN 978-86-89465-54-9

9. Marković A., & V. Krmpot. 2014. A holistic-systemic approach to change management. Economics 60, (3): 149–160. ISSN 0350-137X
10. Osmanagić–Bedenik N. 2003. Crisis as an opportunity: from business crisis to business success. School book, Zagreb. ISBN 953-0-30338-6
11. Radović-Marković M., & H. Hanić. 2018. Research methodology in economic sciences. Belgrade Banking Academy, Faculty of Banking, Insurance and Finance, Institute of Economic Sciences, Belgrade.
12. Republic Institute of Statistics. Downloaded from: https://www.stat.gov.rs/ (10.01.2022).
13. Rosner B. 2011. Fundamentals of B iostatistics. 7th Edition. Brooks/Cole, Cengage Learning, Boston. ISBN 978-0-538-73349-6
14. Tintor J. 2009. Business analysis. Mass media, Zagreb. ISBN 978-953-157-528-7.
15. Vapa Tankosić J., M. Čavlin, & Đ. Budevac. 2020. An Analysis of Central Bank Measures to Mitigate Monetary and Financial Risks Caused by Covid-19, In: Transition to the 21st Century. century (pp. 134-146). Kragujevac: Institute of Applied Sciences Belgrade, Center for Sustainable Development Belgrade, College of Management and Economics Kragujevac, University of Business Studies Banja Luka.