Ekonomski horizonti

Ekonomski fakultet Univerziteta u Kragujevcu
ISSN 1450-863X
2023 *25* (1)

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Ekonomski fakultet
Univerziteta u Kragujevcu

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Štamparija
InterPrint, Kragujevac
Tiraž - 200

Časopis se referiše u bazama:

SCOPUS, EconLit, Cabell's Directories, EBSCO, DOAJ, Index Copernicus, ProQuest - ABI/INFORM, Ulrich's Web

Izdavanje časopisa Ekonomski horizonti finansijski je podržalo **Ministarstvo nauke, tehnološkog razvoja i inovacija Republike Srbije**

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ČASOPIS IZLAZI TRI PUTA GODIŠNJE - u aprilu, avgustu i decembru

ISSN 1450-863X eISSN 2217-9232 UDC 33 COBISS.SR-ID 158022663

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Univerziteta u Kragujevcu

SADRŽAJ

Volumen 25 Sveska 1 **Januar - April 2023.**

Ekonomski horizonti, Januar - April 2023, Volumen 25, Sveska 1, 1 - 2
UDC: 33 ISSN: 1450-863 X

UVODNIK

Naučni časopis *Ekonomski horizonti*, čiji je izdavač Ekonomski fakultet Univerziteta u Kragujevcu, nakon sprovedenog dvostruko anonimnog recenzentskog postupka, u Svesci 1 Volumen 25 Godište 2023 sadrži tri izvorna naučna članka i tri pregledna članka.

Polazeći od činjenice da tehnološke inovacije unose neprekidne promene na tržištu rada, autor *Joshua Adeyemi Afolabi* nastoji da, primenom autoregresionog modela raspoređenih docnji, sagleda vezu između zapošljavanja i inovacija u privrednim sektorima Nigerije. Zaključuje da je ta veza prisutna u kratkom roku; tehnološki napredak podstiče zapošljavanje u uslužnom sektoru i, uz kašnjenje od jednog kvartala, u poljoprivrednom sektoru. Robustnost ovih nalaza proverava se proširivanjem modela dodatnim varijablama - vrednost proizvodnje po sektorima, stopa inflacije i učešće domaćih kredita privatnom sektoru u bruto domaćem proizvodu. Rezultati potvrđuju da razvoj tehnologije podstiče zapošljavanje i preraspodelu radne snage, na osnovu čega autor predlaže punu operacionalizaciju tehnoloških inovacija u svim privrednim sektorima u Nigeriji u cilju rešavanja problema nezaposlenosti.

Naglašavajući da je pitanje uticaja makroekonomskih kretanja na fluktuacije deviznog kursa u zemljama sa nastajućim tržištem i režimom ciljanja inflacije i dalje otvoreno, koautori *Haryo Kuncoro* i *Fafurida Fafurida* istražuju kako deficit tekućeg računa platnog bilansa i obim deviznih rezervi utiču na promenljivost deviznog kursa u Indoneziji. Primenom modela granične nelinearne kvantilne regresije, zaključuju da obe varijable imaju statistički značajan uticaj. Deficit tekućeg računa platnog bilansa ostvaruje uticaj na promenljivost deviznog kursa kada premaši prag od dva procenta bruto domaćeg proizvoda. Budući da je ovaj uticaj asimetričan, u radu se ukazuje na mogućnost da neravnoteža platnog bilansa ugrozi kredibilnost monetarne politike u režimu ciljanja inflacije. Stoga, u radu se ukazuje na potrebu održavanja optimalnog stoka deviznih rezervi kojim se mogu ublažiti fluktuacije deviznog kursa, dok se centralna banka fokusira na postizanje ciljane stope inflacije.

Primenjujući regresione modele panel podataka, autor *Maja Putica* ispituje uticaj poslovnih i institucionalnih determinanti na godišnje efektivne poreske stope u bankama u Republici Srbiji. Koristeći računovodstvenu i tekuću efektivnu poresku stopu kao meru stvarnog poreskog opterećenja, zaključuje da je realno poresko opterećenje banaka u Republici Srbiji znatno manje od zakonskog. Rezultati analize, primenom nekoliko modela koji se razvijaju u radu, ukazuju da je poresko opterećenje pod najvećim uticajem ukrupnjavanja aktive i kapitala banke kupca, kao posledica merdžera i akvizicija. Tekuće efektivne poreske stope se smanjuju sa rastom veličine banke, ali samo do određenog nivoa. Ključna implikacija sprovedene analize je da banke u Republici Srbiji mogu da upravljaju poreskim opterećenjem putem regulisanja nivoa kapitalizacije i veličine.

Na osnovu istraživanja determinanti nezaposlenosti među mladima u Maroku, primenom logističkog modela, koautori *Marwa El Foutoun, Ahmed Kchikeche* i *Driss Mafamane* ukazuju na tri moguće grupe faktora. Prvu čine geografske i sociodemografske karakteristike mladih: pol, starost, bračni status i prebivalište. Socioekonomski faktori, poput porodičnog miljea mladih i broja zaposlenih lica u domaćinstvu, svrstani su u drugu grupu. Konačno, treća grupa faktora odnosi se na različite nivoe formalnog obrazovanja. Autori dolaze do zanimljivog zaključka da postoji veća verovatnoća da će svršeni studenti u Maroku biti nezaposleni nego što je je to slučaj sa osobama koje nemaju nikakvu diplomu, ali i da ova verovatnoća varira u zavisnosti od vrste diplome.

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Ispitujući povezanost umrežavanja i inovativnosti socijalnih preduzeća iz jedanaest evropskih zemalja, koautori *Ana Aleksić Mirić, Zorica Aničić* i *Marina Petrović* ističu da umrežavanje predstavlja jednu od ključnih karakteristika ovih organizacija. Rezultati istraživanja ukazuju da je umrežavanje važan faktor za inovativno ponašanje socijalnih preduzeća osnovanih pre 2000. godine, ali da se njegov značaj gubi u novom milenijumu. Ovi nalazi objašnjavaju se činjenicom da u XXI veku umrežavanje postaje duboko usađeno u svakodnevno funkcionisanje organizacija i predstavlja neophodan uslov poslovanja. Od faktora koji utiču na inovativnost u ovim socijalnim preduzećima izdvajaju se: vrsta privredne delatnosti; značaj koji se pridaje rastu preduzeća kroz povećanje broja ili opsega poslovnih aktivnosti i/ili uvećanje broja zaposlenih; stepen međusobnog poverenja članova organizacije, i najviši stečeni nivo obrazovanja vlasnika ili menadžera socijalnog preduzeća.

Analizirajući odnose između pametnog upravljanja, bezgotovinskog plaćanja i regionalnih prihoda u indonežanskoj Provinciji Severna Sumatra, koautori *Dias Satria, Tiara Juniar Soewardi* i *Joshi Maharani Wibowo* ukazuju na generalno pozitivan stav ispitanika prema elektronifikaciji regionalnih platnih transakcija. Iniciran u uslovima pandemije COVID-19, ovaj proces ima potencijal da intenzivira privrednu aktivnost i da poveća poreske prihode. Primenom modeliranja strukturalnih jednačina metodom parcijalnih najmanjih kvadrata na primarne podatke prikupljene putem upitnika, dokazuje se da očekivane performanse usled usvajanja nove tehnologije, društveni uticaj i tehnički uslovi ispoljavaju statistički značajan pozitivan efekat na prihvatanje bezgotovinskog plaćanja poreza. Načini na koje vlada Indonezije može da intenzivira ovakav vid regionalnih transakcija ogledaju se u podršci edukaciji o prednostima bezgotovinskog plaćanja, unapređenju bankarske i informaciono-telekomunikacione infrastrukture i izgradnji poverenja javnosti u njene kapacitete u ovom domenu.

U ime Uredništva Časopisa i u svoje ime zahvaljujem se autorima priloga koji su objavljeni u ovoj Svesci Časopisa. Istovremeno, posebnu zahvalnost dugujemo recenzentima koji su, svojim konstruktivnim i kritičkim komentarima i sugestijama autorima podnetih priloga, doprineli podizanju nivoa kvaliteta publikovanih članaka.

U januaru 2023. godine, Ekonomski fakultet je izvršio promenu u Uredništvu Časopisa. Članovi prethodnog saziva Uredništva su doprineli da naučni časopis *Ekonomski horizonti* kontinuirano beleži rast u ocenama međunarodnih baza i domaćoj bazi Srpskog citatnog indeksa.

Prilika je da se u ime Ekonomskog fakulteta Univerziteta u Kragujevcu, kao izdavača naučnog časopisa *Ekonomski horizonti*, Uredništva Časopisa i u svoje ime, zahvalim članovima prethodnog saziva Uredništva. Posebno se zahvaljujem dr Vlastimiru Lekoviću, redovnom profesoru u penziji, koji je svojim nesebičnim angažovanjem i posvećenošću u uređivanju doprineo da Časopis ima zapaženu međunarodnu reputaciju. Takođe, zahvaljujem se eminentnim predstavnicima akademske zajednice koji, prihvatanjem članstva u uređivačkom odboru Časopisa, doprinose ugledu *Ekonomskih horizonata* i Ekonomskog fakulteta Univerziteta u Kragujevcu.

Izdavanje časopisa *Ekonomski horizonti* finansijski je podržalo Ministarstvo nauke, tehnološkog razvoja i inovacija Republike Srbije.

Glavni i odgovorni urednik
Milena Jakšić

Milena Jakšić je redovni profesor na Ekonomskom fakultetu Univerziteta u Kragujevcu. Doktorirala je na Ekonomskom fakultetu Univerziteta u Kragujevcu, iz uže naučne oblasti Opšta ekonomija i privredni razvoj. Ključne oblasti njenog naučnoistraživačkog interesovanja su finansijski sistem, finansijska tržišta, finansijski instrumenti i finansijske institucije.

Ekonomski horizonti, Januar - April 2023, Volumen 25, Sveska 1, 3 - 17
UDC: 33 ISSN: 1450-863 X

Original scientific paper
UDC: 001.895:331.5(669.1)
doi:10.5937/ekonhor2301003A

EMPLOYMENT EFFECTS OF TECHNOLOGICAL INNOVATION: EVIDENCE FROM NIGERIA'S ECONOMIC SECTORS

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Technological advancement continues to revolutionize the labor market and has particularly intensified the debate on its employment effect across developing and developed economies. Employing the Autoregressive Distributed Lag (ARDL) framework, this study provides insights into the employment-innovation nexus across the Nigerian economic sectors using the quarterly data from 2011Q1 to 2021Q4. The findings reveal that the employment-innovation nexus is a short-run phenomenon in Nigeria and that technological innovation enhances employment generation in the service sector and the agricultural sector, but it takes a quarter before the positive employment effect occurs. Overall, the results suggest that technological innovation improves employment and reallocates labor across the sectors, which suggests the need to fully operationalize technological innovation across the Nigerian economic sectors in order to tackle the prevailing unemployment conundrum in the country.

Keywords: technological innovation, sectoral employment, ARDL, labor market

JEL Classification: C22, E24, O14

INTRODUCTION

Technological advancement continues to revolutionize the global economy, charting the new paths that were otherwise impracticable in past centuries. The emergence of the fourth industrial revolution (Industry 4.0), the quest for developing knowledge-based economies and the growing spate of globalization further present new opportunities for increased technological advancement. The increasing importance of technological innovation in contemporary times has attracted the attention of academics, researchers and policymakers, among other stakeholders. Thus, there is a growing literature on the determinants and effects of technological innovation (Gyeke-Dako, Oduro, Turkson, Baffour & Abbey, 2016; Piva & Vivarelli, 2017; Krousie, 2018; Okumu, Bballe & Guloba, 2019; Sithole & Buchana, 2021). However, there seems to be a lack of consensus on the labor market effects of technological innovation in the literature, with some studies revealing that technology has employment-creating effects (Piva

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& Vivarelli, 2017; Okumu *et al*, 2019), whereas others argue that it has destructive effects on employment (Campa, 2014; Krousie, 2018; Sithole & Buchana, 2021). Some studies have also shown that technological innovation reallocates labor across economic sectors (Cang, 2017; Yildirim, Yildirim, Erdogan & Kantarci, 2020).

The "creative destruction" concept put forward by J. A. Schumpeter (1942) suggests that technological innovation creates new jobs and destroys old ones, leaving some people better-off and others worse-off. It encourages capital-intensive operations and favors skilled labor, which leads to skill-biased technological change, routine-biased technological change and job polarization (Acemoglu & Autor, 2011; Goos, Manning & Salomons, 2014). The proponents of technological innovation argued that it produced more middle-skill jobs, improved productivity, raised the wage rate of skilled and semi-skilled labor, and increased product varieties, especially in the technology utilizing sector (Aguilera & Barrera, 2016; Piva & Vivarelli, 2017). Recently, the indispensability of technological innovation has been brought to the fore during the COVID-19 pandemic era, as it facilitated product and service delivery despite the lockdown orders of various national governments (Bolaji, Adeoti & Afolabi, 2021; Olanrewaju & Afolabi, 2022).

There is growing advocacy for the full adoption of technological innovation in Nigeria, yet with less consideration for its potential impact on the labor market outcomes, particularly employment. Diverse policy and institutional efforts devoted to the improvement of the adoption of technological innovation and abating unemployment in Nigeria are yet to yield optimal outcomes. For example, Nigeria's ranking on the Global Innovation Index in 2021 is unimpressive, as the country ranked 118 out of 132 countries, thus reflecting low-level technological absorption in the country (World Intellectual Property Organization, 2021). All the more so, the Nigerian labor market is highly saturated given the fact that the unemployment rate is continuing to soar, rising from 7.5% in the first quarter of 2015 to 33.3% in the last quarter of 2020, with youth unemployment contributing remarkably to the growing unemployment rate (National Bureau of Statistics, 2021). This indicates the fact that Nigeria consistently misses out on reaping demographic dividends (Ogunjimi & Oladipupo, 2019) and is likely to be vice-ridden by various social vices and exposed to security challenges (Oji & Afolabi, 2022). Technological innovation can disrupt the labor market, reallocate labor and even displace high-skilled labor, such as doctors, web developers and architects (United Nations, 2017).

Given the fact that the employment effect of technological innovation may differ across economic sectors, this study contributes to the literature by examining the sectoral employment effect of technological innovation in Nigeria. Past studies have provided overwhelming evidence on the employment-innovation nexus, particularly in developed countries, with little evidence on developing economies, including Nigeria (Matuzeviciute, Butkus & Karaliute, 2017; Piva & Vivarelli, 2017; Krousie, 2018; Sithole & Buchana, 2021; Yildirim *et al*, 2020). Most of the studies on the employment-innovation nexus are firm-level and industry-level, with but a few pieces of evidence from aggregate-level studies (Gyeke-Dako *et al*, 2016; Okumu *et al*, 2019). The firm-level studies on the subject matter have two major weaknesses: they fail to fully account for indirect compensation effects (Cang, 2017) and they do not account for the possible crowding-out effects of innovative firms in the labor market (Vivarelli, 2012).

Therefore, this study fills these observed research gaps by conducting a macro-level study on the employment-innovation nexus in Nigeria, with a particular emphasis being placed on sectoral employment. It hinges the relationship between the researched sectoral employment and the matching theory proposed by C. A. Pissarides (1985; 1990). The quarterly data on the selected macroeconomic variables spanning 2011Q1 and 2021Q4 are sourced from reputable databases so as to test the following research hypotheses:

H1: Technological innovation has a statistically significant impact on sectoral employment in Nigeria.

H2: Technological innovation reallocates labor across the Nigerian economic sectors.

The Autoregressive Distributed Lag (ARDL) framework developed by M. H. Pesaran, Y. Shin and R. Smith (2001) is used to analyze the quarterly data and test the research hypotheses.

Following this introductory section, the paper is structured into the following sections: in Section Two, a brief review of the literature and the theoretical framework adopted in this study are presented; Section Three explains the research methodology, while Section Four comprises the empirical analysis. Finally, the conclusions of the study are given in Section Five.

A BRIEF REVIEW OF THE LITERATURE

There is a quantum of empirical evidence on the nexus between technological innovation and employment. However, there seems to be no consensus on the direction and magnitude of the relationship. Some empirical studies have found that technological innovation is employment-generating (Reenen, 1997; Gyeke-Dako *et al*, 2016; Piva & Vivarelli, 2017; Okumu *et al*, 2019), whereas some other studies have alluded to the fact that technological innovation adversely affects employment (Vivarelli, 2013; Cang, 2017; Yildirim *et al*, 2020). Even more so, there are studies that have found that technology has mixed effects on employment (Postel-Vinay, 2002; Vicini, 2016; Dachs, 2018; Sithole & Buchana, 2021). Some other studies have found no significant relationship between the two macroeconomic variables (Aguilera & Barrera, 2016; Matuzeviciute *et al*, 2017).

The key argument in support of the positive relationship between technological innovation and employment is the fact that, through investment in research and development activities, technological innovation makes the production of new product varieties possible, offering consumers a broad range of products to demand (Okumu *et al*, 2019; Sithole & Buchana, 2021), which is likely to stimulate aggregate demand and compel producers to increase production in order to reach the increasing demand level. One of the most feasible means to address the excess demand problem is to hire more labor to raise the production level. Thus, most producers resort to hiring more labor, thereby reducing the number of the people in the unemployment pool (Raifu & Afolabi, 2022), in which way technological innovation creates new jobs through the introduction of new products (the phenomenon called "product innovation") and fosters employment prospects (Vicini, 2016; Dachs, 2018). In fact, M. Piva and M. Vivarelli (2017) argued that product innovation significantly improved employment growth, particularly in high- and medium-tech sectors.

On the other hand, the employment-reducing effect of technological innovation has been closely linked to process innovation - improvement in the production process (Reenen, 1997; Sithole & Buchana, 2021). The argument behind this is that improvement in technology translates to machines replacing humans or reducing the number of humans in the production process, which worsens unemployment, reduces welfare and broadens income gaps. Specifically, B. Dachs (2018) argued that the lopsided digitalization cost distribution resulting from the skill-biased nature of technological change worsened unemployment and income inequality. Thus, process innovation significantly contributes to job displacement, especially that of low-skilled workers. F. Postel-Vinay (2002) argued that improvement in technological innovation accelerated job obsolescence, thus inducing job displacement, simultaneously lowering employment below its equilibrium level. However, M. Vivarelli (2013) argued that process and product innovation were interrelated, and that process innovation did not always lead to job destruction. Providing support for this stance, I. M. Okumu, E. Bbaale and M. M. Guloba (2019) showed that process innovation had the employment-enhancing effect among African manufacturing firms although J. V. Reenen (1997) argued that only the dominance of product innovation over process innovation would make that possible.

P. Li (2021) evaluated the employment effect of technological innovation in China. The result of the

impulse response function showed that technological innovation destroyed jobs in the short run but created jobs in the long run. In a similar fashion, V. Palekhova and O. Kramarenko (2020) examined the employment effect of technological innovation in the financial sector of South Korea, Ukraine, and the United Kingdom. The results showed that the employment level declined as the innovation level increased although the employment effect of innovation varied across the three countries. Precisely, the magnitude of the impact is higher in South Korea and the United Kingdom than in Ukraine. J. I. Ubah, E. K. Bowale, J. O. Ejemeyovwi and Y. Okereke (2021) also evaluated the employment effects of both technological innovation and electricity access in Nigeria using data from 1960 to 2017. The result showed a significant inverse relationship between technology and employment in Nigeria, indicating the fact that technology caused job destruction. Employing the Structural Vector Autoregression (SVAR) model, G. Kindberg-Hanlon (2021) showed that technologies complemented and substituted labor, the substitution effect being more dominant in the short run. Given the high technological development rate in developed countries, employment-displacing technological change is found to be more prevalent in advanced countries with industrial jobs being the most at risk of automation.

Moreover, Y. J. Cang (2017) argued that the nature of the employment effect of technological innovation depended on the geographical location and political regime under consideration. For the United States, the study showed that technology destroyed employment in rural and low-tech regions, and that the adverse employment effect of technological innovation was more pronounced in the Obama regime than in the Bush and Clinton regimes. C. Krousie (2018) supported this stance by alluding to the fact that technological innovation displaced labor in the United States although not substantially, as there were more high-skilled than low-skilled labor in the country. Exploring the possibilities of how artificial intelligence would influence the future of work, R. Campa (2014) argued for an imminent end of work and the end of robots while predicting disparity in the future of human societies influenced by the factors such as political awareness, the democratic rule and infrastructural development.

THE THEORETICAL FRAMEWORK AND METHODOLOGY

This study is built on the theoretical foundation of search and matching theory, the choice of which is based on its exceptional ability to clearly explain the dynamics of the labor market with regard to workers' displacement and rehiring often caused by frictional unemployment (the skill mismatch) and structural unemployment (technology-induced unemployment) (Pissarides, 1990; Mortensen & Pissarides, 1998). The search and matching model describes and explains creative job destructions and the formation of new jobs, which is one of the major thrust of this study. This theory models markets where frictions inhibit economic activities from instantaneously adjusting to market dynamics. The key assumptions underlying search and matching theory are the high heterogeneity of workers and jobs and the risk-neutrality of workers seeking to maximize their utility per unit of time. The unemployed search for jobs following frictional or structural unemployment and can only be matched with the jobs for which they have requisite skills so as to maximize their labor efficiency. C. A. Pissarides (1985) argued that, in the case of uneven matches, some of the least productive employers/workers might become less profitable following a negative aggregate shock, which could lead to the retrenchment of workers and an increase in the number of the labor force in the unemployment pool. On the other hand, employers may immediately hire new workers during or after a positive aggregate shock, given the fact that job hires are conditional on imperfect matching technology.

Drawing from the foregoing discussion, the theoretical model analyzing the effects of technological innovation on employment in Nigeria can be written as follows:

$$EMP = f(GDP, INN) \tag{1}$$

where EMP, GDP and INN denote employment, the real GDP (a proxy for the aggregate shock) and technological innovation, respectively. However, in order to capture sectoral effects, employment and the real GDP are disaggregated across the sectoral lines - agriculture, industry and service. In addition, following D. C. Yildirim *et al* (2020), the two key macroeconomic variables (the inflation rate and credit to the private sector) are incorporated in the model as the control variables. Their inclusion hinges on the fact that they are significant drivers of employment in each economic sector and their omission from the estimated model may result in the omitted variable bias (Dogan & Inglesi-Lotz, 2020). Thus, equation (1) can be disaggregated into the three equations as follows:

$$AGR\_EMP_t = \alpha_1 + \alpha_2 INN_1 + \alpha_3 AGR\_Y_t + \alpha_4 INF_t + \alpha_5 CPS_t + \varepsilon_{2t} \quad (2)$$

$$IND\_EMP_t = \beta_1 + \beta_2 INN_1 + \beta_3 IND\_Y_t + \beta_4 INF_t + \beta_5 CPS_t + \varepsilon_{3t} \quad (3)$$

$$SER\_EMP_t = \delta_1 + \delta_2 INN_1 + \delta_3 SER\_Y_t + \delta_4 INF_t + \delta_5 CPS_t + \varepsilon_{4t} \quad (4)$$

where *AGR_EMP, IND_EMP,* and *SER_EMP* denote employment in the agricultural sector, employment in the industrial sector, and employment in the service sector; *INN* stands for innovation; *AGR_Y,* IND_Y, and *SER_Y* denote the agricultural output, the industrial output, and the service output, respectively, and *INF* and *CPS* denote inflation and domestic credit to the private sector, respectively. Some of the common measures of innovation in the literature are information and communication technology (ICT), research and development (R&D) spending, and patents. However, the World Intellectual Property Organization (WIPO) developed a composite index, the Global Innovation Index (GII), that comprehensively captures all innovation indicators. Following V. Palekhova and O. Kramarenko (2020), the GII is adopted in this study as the measure of technological innovation. Based on economic theories, technological innovation could either enhance or destroy employment. Thus, the GII coefficient is expected to have either a positive or a negative sign. The coefficients of the sectoral output and credit to the private sector, however, are expected to have positive signs as these variables have a direct effect on employment prospects (Yildirim *et al*, 2020). On the other hand, inflation reduces real income and the purchasing power of producers, subsequently hampering their capability to employ more labor (Ogunjimi, 2019; Aminu & Ogunjimi, 2019). Thus, the inflation coefficient is expected to be negative.

The Autoregressive Distributed Lag (ARDL) approach developed by M. H. Pesaran, Y. Shin and R. Smith (2001) is adopted so as to estimate the specified models. The approach is selected for the three major reasons. First, it has an inherent capacity (the bounds test) to check for the existence or otherwise of the long-term relationship among the variables. Second, it accommodates stationary and nonstationary series, provided they are not I(2), i.e. integrated of order two. Third, it simultaneously generates both short- and long-term estimates (Pesaran *et al*, 2001). The ARDL version of the equations 2, 3 and 4 is written as follows:

$$\Delta AGR\_EMP_t = \gamma + \alpha AGR\_EMP_{t-1} + \alpha_1 INN_{t-1} + \alpha_2 AGR\_Y_{t-1} + \alpha_3 INF_{t-1} + \alpha_4 CPS_{t-1} + \sum_{j=1}^{n} \varnothing_j \Delta AGR\_EMP_{t-j} + \sum_{j=0}^{n} \varnothing_j \Delta INN_{t-j} + \sum_{j=0}^{n} \varnothing_j \Delta AGR\_Y_{t-j} + \sum_{j=0}^{n} \varnothing_j \Delta INF_{t-j} + \sum_{j=0}^{n} \varnothing_j \Delta CPS_{t-j} + \varepsilon_{1t} \quad (5)$$

$$\Delta IND\_EMP_t = \delta + \beta IND\_EMP_{t-1} + \beta_1 INN_{t-1} + \beta_2 IND\_Y_{t-1} + \beta_3 INF_{t-1} + \beta_4 CPS_{t-1} + \sum_{j=1}^{n} \theta_j \Delta IND\_EMP_{t-j} + \sum_{j=0}^{n} \theta_j \Delta INN_{t-j} + \sum_{j=0}^{n} \theta_j \Delta IND\_Y_{t-j} + \sum_{j=0}^{n} \theta_j \Delta INF_{t-j} + \sum_{j=0}^{n} \theta_j \Delta CPS_{t-j} + \varepsilon_{2t} \quad (6)$$

$$\Delta SER\_EMP_t = \rho + \omega SER\_EMP_{t-1} + \omega_1 INN_{t-1} + \omega_2 SER\_Y_{t-1} + \omega_3 INF_{t-1} + \omega_4 CPS_{t-1} + \sum_{j=1}^{n} \varphi_j \Delta SER\_EMP_{t-j} + \sum_{j=0}^{n} \varphi_j \Delta INN_{t-j} + \sum_{j=0}^{n} \varphi_j \Delta SER\_Y_{t-j} + \sum_{j=0}^{n} \varphi_j \Delta INF_{t-j} + \sum_{j=0}^{n} \varphi_j \Delta CPS_{t-j} + \varepsilon_{3t} \quad (7)$$

where Δ is the first difference operator; γ, δ and ρ are the intercepts; and ε_{it} is the white noise residuals. The equations 5, 6 and 7 were estimated in the stepwise manner. In the baseline models, only technological innovation was first regressed on sectoral employment, but the other explanatory variables were subsequently introduced into the model, which essentially served to gain an insight into the individual effect of technological innovation on sectoral employment before and after the introduction of the control variables. The 2011Q1 to 2021Q4 quarterly data on the variables of interest were sourced from the Central Bank of Nigeria (CBN), the World Bank (WB) and the World Intellectual Property Organization (WIPO) databases. Each of the variable has different frequencies. Thus, all the variables were converted into quarterly series using the quadratic data smoothing statistical method (Oloko & Yusuf, 2021). The sources and description of each variable are presented in Table 1.

RESULTS AND DISCUSSION

Descriptive statistics

Table 2 provides the basic descriptive statistics of the key variables of interest. It shows the dominance of the Nigerian service sector given its average contribution to the aggregate output (52.4 per cent) and employment (51.2 per cent), which suggests that the Nigerian service sector absorbs more labor and contributes more to the aggregate output than the agricultural and industrial sectors put together. This impressive performance has been attributed to the relative adoption of technological innovation by actors and players in the Nigerian service sector (Ogunjimi, 2020a, 2020b; Afolabi, Olanrewaju & Adekunle, 2022). On the other hand, however, the relatively low contribution of the agricultural and industrial sectors to both the aggregate output and employment in Nigeria is linked to neglecting these sectors in the wake of Nigeria's discovery of crude oil in commercial quantities in the 1970s (Afolabi & Ogunjimi, 2020; Afolabi & Oji, 2021). The average value of the innovation score in Nigeria is also very low and the country ranks perpetually low on the global innovation index, failing to make the top 100 innovative countries in the world (WIPO, 2021), which implies the fact that Nigeria would have to import technology just as it does when other merchandise products are concerned so as to meet the demand of the contemporary knowledge-based economy. On the other hand, the average inflation rate in Nigeria is double-digit, while the average share of domestic

Table 1 The data description

Variables	Measurement	Source
Agricultural sector employment (AGR_EMP)	% of the total employment	WB (2021)
Agricultural sector output (AGR_Y)	% of the GDP	CBN (2021)
Industrial sector employment (IND_EMP)	% of the total employment	WB (2021)
Industrial sector output (IND_Y)	% of the GDP	CBN (2021)
Service sector employment (SER_EMP)	% of the total employment	WB (2021)
Service sector output (SER_Y)	% of the GDP	CBN (2021)
Technological innovation (INN)	Global Innovation Index	WIPO (2022)
Inflation (INF)	%	CBN (2021)
Domestic credit to private sector (CPS)	% of the GDP	CBN (2021)

Source: Author

credit to the private sector in the total GDP ranges between 0.1 per cent to 31.8 per cent for the period under consideration. Interestingly, the standard deviation of all the variables, except for domestic credit to the private sector, is relatively low, suggesting that the variables are not broadly dispersed from their respective mean values.

Table 2 The descriptive statistics

Variables	Mean	Minimum	Maximum	Standard Deviation
AGR_EMP	37.06	34.89	40.98	1.70
IND_EMP	11.72	9.86	12.05	0.60
SER_EMP	51.22	49.16	53.11	1.20
AGR_Y	24.27	19.65	30.77	3.17
IND_Y	23.35	18.05	28.83	2.50
SER_Y	52.38	46.79	55.67	2.45
INN	23.86	19.52	30.69	2.75
INF	12.23	7.82	18.45	3.22
CPS	5.29	0.10	31.77	9.68

Source: Author

The unit root test

The unit root test is highly important in time-series and panel studies for the determination of the stationary properties of variables, which guides the choice of the estimation technique so as to avoid generating unreliable estimates. The Phillip Perron (PP) and Augmented Dickey Fuller (ADF) approaches are adopted in this study. These unit root test approaches test the null hypothesis (the variables contain the unit root) against its alternative. The decision to accept/reject the hypothesis depends on the probability values of each variable. If the probability value exceeds 10 percent, the null hypothesis will be accepted; it will be rejected otherwise. The unit root test results reported in Table 3 account for the fact that some variables are stationary (I(0)) while others are not (I(1)). Specifically, the variables have a mixed order of integration, which satisfies one of the conditions for adopting the ARDL framework.

The cointegration test

The findings generated from the unit root test indicate the imperative of determining whether there is a long-term relationship among the variables or not in order to account for it in the ARDL estimation. The bounds test is used in this regard, which tests the null hypothesis of no long-term relationship, which is rejected if the F-statistic exceeds the upper bound critical value but is accepted if it falls below the lower bound critical value. However, uncertainty surrounds the long-term relationship if the F-statistic falls within the range of the upper and lower bound

Table 3 The results of the unit root tests

Variables	Phillip Perron (PP)			Augmented Dickey Fuller (ADF)		
	Level	1st Difference	I(d)	Level	1st Difference	I(d)
AGR_EMP	-3.19**a	-	I(0)	-2.23a	-2.70***a	I(1)
IND_EMP	-6.09*a	-	I(0)	-5.91*b	-	I(0)
SER_EMP	-1.39b	-3.22**a	I(1)	-2.28b	-3.07**a	I(1)
INN	-3.02b	-3.55**a	I(1)	-4.19**b	-	I(0)
AGR_Y	-8.12*b	-	I(0)	-2.42b	-2.97**a	I(1)
IND_Y	-11.70*b	-	I(0)	-2.59b	-4.14*a	I(1)
SER_Y	-10.19*b	-	I(0)	-1.99b	-3.09**a	I(1)
INF	-2.11b	-3.32**a	I(1)	-2.99b	-3.69*a	I(1)
CPS	-1.44a	-5.20*b	I(1)	-1.61a	-5.29*b	I(1)

Note: * p<0.01, ** p<0.05, *** p<0.1. 'a' and 'b' denote the model with the constant and the model with the constant and the trend, respectively. I(0) and I(1) indicate stationarity at the level and the first difference, respectively.

Source: Author

critical values. In this light, the bounds test results reported in Table 4 are indicative of the nonexistence of the long-term relationship between sectoral employment and technological innovation in Nigeria as the result of the baseline models shows that their respective F-statistics fall below the lower bound critical values at all the significance levels. In a similar fashion, the results of the alternative models show the nonexistence of the long-term relationship among the variables in the employment models in the agricultural and service sectors, whereas the result indicates uncertainty for the employment model in the industrial sector. Succinctly, the link between sectoral employment and technological innovation is a short-term phenomenon in Nigeria, which is suggestive of the fact that whatever impact technological innovation has on sectoral employment, that impact is not permanent.

Model estimation and discussion

Following the cointegration test results that indicate the nonexistence of the long-term relationship between sectoral employment and technological innovation, the short-term ARDL model is estimated, and the result is given in Table 5. It shows that the effect of technological innovation on employment differs across the sectors. For the agricultural sector, technological innovation has an instantaneous negative impact on employment generation but creates jobs after a period of one quarter. Expectedly, an increase in the adoption of technological innovation in the agricultural sector fosters the replacement of humans with machines as the latter can perform agricultural tasks faster and more efficiently, which explains the immediate negative impact of technological innovation on employment in the agricultural sector and corroborates the finding of J. I. Ubah, E. K. Bowale, J. O. Ejemeyovwi and Y. Okereke (2021), who argued that technology induced job destruction in Nigeria.

In addition, the low level of technological knowhow in Nigeria contributes to the adverse impact of technological innovation on employment in the agricultural sector. This result corroborates the finding of N. Kumar, K. S. Suhag, J. Kumar and R. Singh (2010), who showed that machinery displaced human labor through improvement in farm technology. In a similar manner, technological innovation has a positive but statistically insignificant effect on employment in the industrial sector. This technology-induced employment improvement in the industrial sector could be attributed to the increase in the agricultural output and employment that makes raw materials available for the industry. Given the fact that access to raw material is a major factor hampering the performance of the Nigerian industrial sectors, technological innovation is a viable tool to not

Table 4 The bounds test result

Significance Level (k=4)	Lower Bound	Upper Bound	Models	F-statistic
10%	2.45	3.52	AGR_EMP	2.48
5%	2.86	4.01	IND_EMP	3.74
1%	3.74	5.06	SER_EMP	1.52
Significance Level (k=1)				
10%	4.04	4.78	AGR_EMP	2.86
5%	4.94	5.73	IND_EMP	1.79
1%	6.84	7.84	SER_EMP	0.80

Note: k denotes the number of the explanatory variables; AGR_EMP, IND_EMP and SER_EMP denote the employment models in the agricultural, industrial and service sectors, respectively. The critical values are obtained from Pesaran *et al* (2001), Case III: Unrestricted intercept and no trend.

Source: Author

only increase the agricultural output but also enhance industrial performance in terms of their contribution to the aggregate output and employment. This result gives credence to the stance of A. Aminu and I. A. Raifu (2019), who alluded to the fact that technology fostered intersectoral linkages and improved the aggregate output and employment.

The narrative is also similar when speaking about the service sector as technological innovation has a significant and instantaneous positive impact on employment in this sector. Given the fact that technological innovation is a product of R&D activities, its deployment and adoption in the service sector for various purposes, including employment, suggest the existence of intra-industry linkages. Comparatively, technological innovation has a more positive impact on the service sector than on the agricultural and industrial sectors, indicating that technological innovation creates more jobs in the service sector than in the other economic sectors in Nigeria. This stance is supported by A. Aminu and I. A. Raifu (2019) and M. Bolaji, J. O. Adeoti and J. A. Afolabi (2021), who alluded to the fact that the service sector benefited more from technological innovation than the other Nigerian economic sectors. Overall, technological innovation not only influences sectoral employment through employment creation and destruction but also reallocates labor across the sectors. Thus, technological innovation plays a complementary role, rather than a substitutionary one, with the labor market outcomes in the Nigerian economic sectors.

The diagnostic tests show that the model results are fit for policy formulation as the models are correctly specified and free from both serial correlation and heteroscedasticity. The adjusted R-squared statistics also show that the models have good fits, and the probability of the F-statistics indicates the models' significance. However, the residuals are not normally distributed for the agricultural and industrial employment models. U. Knief and W. Forstmeier (2021) argued that the non-normality of residuals did not affect the reliability of the estimates. Thus, the results of the agricultural and industrial employment models remain reliable.

There are different determinants of employment in the literature other than technological innovation

Table 5 The employment-innovation nexus in Nigeria

Variables	AGR_EMP Model	IND_EMP Model	SER_EMP Model
D(AGR_EMP(-1))	0.521* (0.1265)		
D(IND_EMP(-1))		0.490* (0.1057)	
D(SER_EMP(-1))			0.595* (0.1250)
D(INN)	-0.128* (0.0237)	0.011 (0.0086)	0.119* (0.0263)
D(INN(-1))	0.063** (0.0296)		-0.063** (0.0296)
C	1.192** (0.5053)	1.066* (0.2502)	1.240 (0.9399)
Adjusted R-squared	0.721	0.807	0.570
F-statistic	27.42 [0.0000]	58.26 [00000]	14.60 [0.0000]
Post-Estimation Tests			
Jarque-Bera	49.18 [0.0000]	192.36 [0.0000]	0.29 [0.8653]
Breusch-Godfrey Serial Correlation LM Test	0.78 [0.6784]	1.71 [0.4257]	4.50 [0.1054]
Heteroskedasticity Test: ARCH	0.01 [0.9402]	0.11 [0.7448]	0.02 [0.8858]
Ramsey RESET Test	0.31 [0.5790]	1.54 [0.2603]	1.23 [0.2764]

Note: * p<0.01, ** p<0.05, *** p<0.1. The numbers in block brackets and parentheses are the probability values and the standard errors, respectively.

Source: Author

(Palekhova & Kramarenko, 2020; Ubah *et al*, 2021). Therefore, the employment-innovation model is extended to account for the role of the sectoral output, inflation and domestic credit to the private sector. The results are presented in Table 6. Compared to the previously estimated employment-innovation model, there is no difference in the sign of the impact although the magnitude of the impact (of technological innovation on sectoral employment) reduces when the control variables are introduced. For the sectoral output variables, the results reveal that the sectoral output has a positive but insignificant effect on employment across the three sectors under consideration, which suggests that sectoral employment is not primarily driven by the sectoral output in Nigeria. The impact of domestic credit to the private sector appears to be mixed across the sectors. Consistent with the a priori expectation, domestic credit to the private sector exerts a positive influence on employment in the agricultural sector but has a devastating employment effect in the service sector. The result appears to be statistically insignificant for the industrial sector, implying that domestic credit to the private sector is not a determinant of employment in the industrial sector. The finding on the positive link between employment in the agricultural sector and domestic credit to the private sectors corroborates the finding of J. A. Afolabi, B. U. Olanrewaju and W. Adekunle (2022), who showed that domestic credit to the private sector as a measure of financial development had growth-enhancing and employment-generating effects in Nigeria.

The model diagnostics show that the estimated models have a good fit, which is far better than the baseline model (the model with only technological innovation as the explanatory variable) as the explanatory variables provide more explanations to the variation in sectoral employment. All the explanatory variables also jointly predict sectoral

Table 6 The role of the other factors in the employment-innovation nexus

Variables	AGR_EMP Model	IND_EMP Model	SER_EMP Model
D(AGR_EMP(-1))	0.434* (0.0889)		
D(IND_EMP(-1))		0.528* (0.0956)	
D(SER_EMP(-1))			0.431* (0.1071)
D(INN)	-0.094* (0.0207)	0.004 (0.0078)	0.093* (0.0234)
D(INN(-1))	0.046** (0.0216)		-0.044*** (0.2398)
D(AGR_Y)	0.004 (0.0045)		
D(IND_Y)		0.0004 (0.0037)	
D(SER_Y)			0.008 (0.0059)
D(INF)	0.010 (0064)	-0.017* (0.0054)	0.011 (0.007)
D(INF(-1))		0.015* (0.0055)	
D(CPS)	0.028* (0.0059)	-0.001 (0.0009)	-0.030* (0.0066)
C	1.142* (0.3252)	1.282* (0.2790)	-1.272* (0.4599)
Adjusted R-squared	0.827	0.836	0.763
F-statistic	40.18 [0.0000]	42.91 [0.0000]	23.13 [0.0000]
Post-Estimation Tests			
Jarque-Bera	3.19 [0.2027]	78.07 [0.0000]	0.29 [0.8653]
Breusch-Godfrey Serial Correlation LM Test	4.23 [0.1204]	4.18 [0.1237]	4.50 [0.1054]
Heteroskedasticity Test: ARCH	0.05 [0.8249]	0.96 [0.3281]	0.02 [0.8858]
Ramsey RESET Test	0.004 [0.9494]	2.83 [0.1546]	1.23 [0.2764]

Note: * p<0.001, ** p<0.05, *** p<0.1. The numbers in block brackets and parentheses are the probability values and the standard errors, respectively.

Source: Author

employment as depicted by the probability value of the respective models. In a similar fashion, the postestimation test results show the reliability of the model estimates for policy prescriptions as the models have a correct specification, are homoscedastic and not serially correlated. In addition, the residual of each model is normally distributed, except for the model of employment in the industrial sector. In general, the diagnostic and postestimation test results signal the soundness of the policy options that might emanate from the findings.

CONCLUSION

Employing the ARDL framework and using the quarterly data spanning the period between 2011Q1 and 2021Q4, this study focused on demystifying the effect of technological innovation on employment across the Nigerian economic sectors. The analysis was carried out in two stages. First, the employment-innovation nexus was evaluated. Second, the role of the sectoral output, inflation and domestic credit to the private sectors in the employment-innovation nexus was thereafter analyzed. The result of the ARDL models revealed that the relationship between employment and technological innovation in Nigeria was a short-term phenomenon. The short-term estimates revealed the fact that technological innovation improved employment creation in the service sector but reduced employment generation in the agricultural sector. However, employment generation occurred one quarter after technological innovation had been introduced. The results also signaled the reallocation of labor across the Nigerian economic sectors.

The empirical results of the preset hypotheses suggest that the hypotheses should be accepted. The synopsis of the results of the hypotheses reads as follows:

- Technological innovation substantially improves employment generation in the service sector, as well as the agricultural sector, although the magnitude of the impact is higher in the service sector than in the agricultural sector.
- The agricultural sector's employment-creating capacity is less responsive to changes in technological innovation than the service sector's as it takes about three months before the introduction of the new technology can generate employment in the agricultural sector.
- Technological innovation has the labor-reallocating capacity as it displaces and absorbs labor across the considered sectors.

The key practical policy implication of these findings is the need to fully operationalize and adopt technological innovation, especially in the Nigerian agricultural and service sectors, which can be done by implementing extant science, technology and innovation (STI) policies and formulating the new policies that mainstream innovation into sectoral productive operations as well. This effort will not only increase the productivity of the existing employees across the sectoral groups, but it will also create new jobs that will reduce the number of the labor force in the unemployment pool.

The key limitations of this study are twofold. First, it assumes linearity in the technology-employment nexus in Nigeria. Second, the data paucity limited the scope of the study. The findings of this study remain valid notwithstanding these limitations. Future research may explore nonlinear approaches so as to evaluate the asymmetric relationship between technological innovation and employment in Nigeria and other developing countries.

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Received on 8th December 2022,
after two revisions,
accepted for publication on 21th April 2023.
Published online on 27th April 2023.

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UČINCI TEHNOLOŠKIH INOVACIJA U DOMENU ZAPOŠLJAVANJA: DOKAZI IZ PRIVREDNIH SEKTORA NIGERIJE

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Tehnološki napredak neprekidno unosi korenite promene na tržištu rada, a naročito je podstakao raspravu o učincima tehnoloških inovacija u domenu zapošljavanja ne samo u ekonomijama u razvoju, već i u razvijenim ekonomijama. U ovoj studiji se primenjuje autoregresioni model raspoređenih docnji (ARDL), što omogućava sagledavanje veze između zapošljavanja i inovacija u svim privrednim sektorima Nigerije u periodu od prvog kvartala 2011. do četvrtog kvartala 2021. godine. Saznanja do kojih se u studiji došlo pokazuju da je veza između zapošljavanja i tehnoloških inovacija u Nigeriji kratkoročan fenomen i da tehnološke inovacije podstiču zapošljavanje u uslužnom i poljoprivrednom sektoru, ali je potreban jedan kvartal da bi se osetili pozitivni učinci tih inovacija u domenu zapošljavanja. Dobijeni rezultati ukazuju na činjenicu da tehnološke inovacije pospešuju zapošljavanje i preraspodelu radne snage u svim sektorima, što ukazuje na potrebu pune operacionalizacije tehnoloških inovacija u svim privrednim sektorima u Nigeriji kako bi se pristupilo rešavanju složenog pitanja trenutne nezaposlenosti u ovoj zemlji.

Ključne reči: tehnološke inovacije, sektorska zaposlenost, autoregresioni model raspoređenih docnji, tržište rada

JEL Classification: C22, E24, O14

Ekonomski horizonti, Januar - April 2023, Volumen 25, Sveska 1, 19 - 33
UDC: 33 ISSN: 1450-863 X

Original scientific paper
UDC: 336.717.4:339.74(594)
doi:10.5937/ekonhor2301019K

CURRENT ACCOUNT IMBALANCES AND EXCHANGE RATE VOLATILITY: EMPIRICAL EVIDENCE FROM INDONESIA

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Whether macroeconomic fundamentals affect the exchange rate volatility in emerging markets with an inflation-targeting regime or not is highly challenging. In this paper, the impact of the current account deficits and foreign reserves on the volatility of real exchange rates. Applying threshold quantile regression models related to Indonesia over the period from 2005(7) to 2021(12), it is concluded that both variables play an important role in controlling the exchange rate instability. Both coefficients are also found to have an upward linear pattern. The asymmetric impact of current account balance holds. Claiming that a two-percent current account deficit in the GDP is the safe amount of the deficit that will not significantly affect the foreign-exchange rate is justified as such. The asymmetric behavior of the current account balance has the potential to trigger real exchange rate volatility, thereby undermining the monetary policy within the framework of the inflation targeting regime. Accordingly, the optimal stock of foreign reserves might avoid imposing dual goals of inflation targeting and exchange rate stability.

Keywords: current account, foreign reserves, exchange rate, asymmetric response, quantile regression

JEL Classification: E58, F31, F32, O24

INTRODUCTION

The 1997-1998 Asian Currency Crisis and the 2008 Global Financial Crisis made emerging markets pay more attention to external economic factors. Alongside successful stabilization programs, the main external factors determining the fluctuation of exchange rates are challenging. On the one hand, huge current account deficits underlie the financial instability problem (Kaminsky, Lizondo & Reinhart, 1997; Calderon, Chong & Loayza, 2002). In relatively noncompetitive environments, the emerging market's exchange rates are more volatile than those in developed economies (Chițu & Quint, 2018).

Additionally, the main cause for the currency/monetary crisis is the shortage of foreign reserves in developing countries in Asia (Edwards, 2004; Levy-Yeyati, Sturzenegger & Gluzmann, 2013). Countries

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preserve foreign reserves as a surprise absorber to cope with sudden brief fluctuations in worldwide payments (Aizenman & Lee, 2007). High international reserves reduce vulnerability to speculative attacks (Cheung & Qian, 2009) and limit exchange rate depreciation (Arslan & Cantú, 2019). The growth and level of foreign reserves are also a signal to global financial markets for the credibility and solvency of those countries' monetary policies (Andriyani, Marwa, Adnan & Muizzuddin, 2020).

Others argue that the current account deficits should be less of an issue when financed by capital and/or financial inflows (Frankel & Rose, 1996; Chinn & Prasad, 2003). Capital market liberalization can compensate for current account imbalances (Steiner, 2013) and therefore lower exchange rate instability. Hence, liquid currencies and stable financial markets are necessary to attract capital and/or financial inflows (Verma & Bhakri, 2021), which in turn boosts foreign exchange in supply and eventually softens exchange rate volatility.

However, holding huge foreign reserves is not risk-free in terms of the opportunity cost (Green & Torgeson, 2007), lost aggregate income or welfare (Chan, 2007), or even the disruption of financial markets (Mohanty & Turner, 2006). In a similar fashion, covering a current account deficit after capital and/or financial inflows suffers a capital reversal or a sudden stop in capital inflows, which may exert adverse pressure on exchange rate volatility. Therefore, optimal foreign reserves in relation to a benefit and a cost is desirable for exchange rate stabilization (Islam, 2021).

Indonesia is a good example to discuss those issues on. Suffering a sky-rocketing inflation rate, dropped economic growth and the heavy currency depreciation during the 1997-1998 Asian financial crisis enforced Indonesia' monetary authority to implement various economic recovery agendas. In relation to the stabilization programs, the Central Bank switched the monetary policy frameworks to and fully adopted the inflation targeting (IT) regime in July 2005. All the fundamental changes made were aimed at achieving a stable currency (the Indonesian rupiah) both in terms of inflation and exchange rates, the single goal as mandated by the new Law on the Central Bank.

In line with the independence of the Central Bank, the monetary authority discarded capital flow restrictions, removed interest rate limitations, replaced fixed exchange rates with a flexible exchange rate system, and deregulated almost the entire financial system. As a result, during the 2008 global financial crisis, Indonesia enjoyed relatively low inflation and stable exchange rates compared to the previous crisis. Unfortunately, Indonesia's current account has fallen into deficit since late 2011. The target of the two-percent current account deficit to the GDP ratio often was not reached. M. N. Nugroho, I. Ibrahim, T. Winarno and M. I. Permata (2014) show that the exchange rate depreciated 12.7 percent month-on-month once the current account deficit exceeded the GDP threshold of two percent.

Many researchers found that the Indonesia' current account deficits are unsustainable (Nurmalindah & Safuan, 2013; Asmarani & Falianty, 2015) or even insolvent (Garg & Prabheesh, 2022). To finance the unsustained current account imbalances, the country relies on the capital and financial flows accumulated in foreign reserves. The growth of international reserves has been remarkable in recent years. The foreign currency reserves have amounted to about 12.7 percent of the GDP at the end of 2020 and were capable of covering imports for nine months ahead, which is much longer than the conventional minimum standard of the three months' import.

Despite the substantial progress of the sectoral economy and the monetary policy management in Indonesia so far, the current account deficit remains chronic in nature. Indonesia's most exported products are raw materials, whereas manufactured export products are supported by raw materials, intermediate goods, and capital equipment derived from imports. The strong correlation between exports and imports implies that the debt service payment plays a more dominant role in the current account imbalance. As will be shown, the current account imbalances and the foreign reserves are separately analyzed in conjunction with exchange rate movements, and some studies have not taken into account their joint effect yet.

Accordingly, the purposes of this article include the investigation of (a) whether there are sufficient foreign exchange reserves to finance current account imbalances in order to hedge exchange rate instabilities or not; and (b) whether the maximum two percent current account deficit to the GDP ratio is empirically justified to maintain exchange rate performance and satisfy the optimal hoarding of foreign exchange reserves. Hence, the hypotheses to be tested in this study are as follows:

H1: Current account imbalances provoke exchange rate volatility.

H2: The accumulation of foreign reserves has a positive significant effect on the alleviation of exchange rate volatility.

H3: A two-percent current account deficit to the GDP ratio has no discernible impact on the declining of exchange rate volatility.

This article adds to the empirical literature on the international monetary policy in emerging markets with an IT regime. Combining the two fundamental macroeconomic variables in a unified method, quantile regression, which permits the outlier observations that often emerge in developing countries, is used. A nonlinear threshold quantile regression model is also designed so as to capture the asymmetric change in the exchange rate volatility position throughout the distribution.

This paper is organized as follows: in Section 2, a review of the empirical literature is given; the research methodology and the data used for the estimation are described in Section 3; Section 4 contains the estimates and the discussion of the results obtained, while conclusions are presented in Section 5.

REVIEW OF EMPIRICAL LITERATURE

The current account balance comprises the balance of trade in goods/services and net investment earnings from foreign assets plus net transfers. In general, a current account deficit is a consequence of an increasing net trade deficit where the value of imports is greater than the value of exports. As a result, there will be a leakage in terms of the net money outflow from a home's income circulation. Consumers and producers pay for the imported goods/services in their own currency, which in turn is converted into the counterpart country's currency. Hence, an increasing current account deficit causes an increased supply of a home currency in foreign exchange markets, resulting in the external value of the domestic currency drops.

Persistent exchange rate depreciation can be induced by fundamental factors, such as low productivity growth in the traded goods/services industry or the unexpected terms of a trade shock (Roubini & Wachtel, 1999). In a free-floating exchange rate regime, the increasing net trade deficit might also have been generated by a fall in the value of exports, which will lead to the supply of foreign currency shifts to the left, which causes the home currency depreciation. In a managed or fixed exchange rate regime, this could reflect the mismatch between the monetary policy in place and the exchange rate policy, resulting in an overvalued exchange rate (Bubula & Ötker-Robe, 2003).

An overvalued exchange rate may trigger a decrease in savings when domestic residents intertemporally substitute current consumption for future consumption. It will further broaden the current account imbalance and decrease foreign reserves. A decline in foreign reserves can be reinforced by the expectations of the future devaluations that will drive capital outflows. Large capital outflows may also induce exchange rate depreciation in a flexible exchange rate system. If it is not accompanied by long-term fundamental factors, it can cause undervaluation. Eventually, the weakening of external imbalances retards a country's ability to achieve the conditions of exchange rate stability.

The empirical studies concerning the impact of current account imbalances on exchange rate fluctuations offer a diverging result. D. K. Das (2016) points out the fact that current account imbalances have a negative impact on the real effective exchange rate in the case of developed countries. For developing

countries, current account imbalances distort the stability of the exchange rate. In contrast, S. T. Jawaid and S. A. Raza (2013) observe that there is a long-term positive association, as well as a reciprocal causal relationship, between current account deficits and the exchange rate. However, P. Dybka and M. Rubaszek (2017) find that the exchange rate has a very limited effect on the current account balance for the largest number of developing countries.

Although current account imbalances adversely affect exchange rate stability, the effect of foreign reserves on exchange rate fluctuations in IT regimes provides ambiguous results. Foreign reserves accumulation has a limited impact on exchange rate volatility (Petreski, 2012). Foreign reserves might potentially turn the exchange rate into a nominal anchor and support inflation targets (Osawa, 2006). Unexpected changes in financial dollarization greatly influence nominal exchange rates (Fabris & Vujanovic, 2017). Nevertheless, foreign reserves mitigate exchange rate volatility in the IT period compared to the pre-IT period (Fermo & Lemence, 2014).

For individual IT countries, foreign reserves have a mixed impact on exchange rate stability. The decrease in Slovakia's foreign reserves has a greater impact on the exchange rate than the increase in its foreign reserves (Banerjee, Zeman, Ódor & Riiska Jr, 2018). S. Stevanovic, I. Milenkovic and S. Paunovic (2022) note that, for Albania and Romania, the adoption of the IT regime has no meaningful impact on macroeconomic instability. Declining South Korean foreign reserves boost exchange rate volatility in the long run (Law, 2019). The sufficiency of foreign reserves in Chile is more sound to manage exchange rate volatility primarily when the level of the exchange rate is high (Hansen & Morales, 2019). Meanwhile, the foreign reserves stock in Turkey is completely ineffective to overcome exchange rate volatility and its movements (Tümtürk, 2019).

Purely in the case of Indonesia, the related studies are limited. Most studies pay more attention to exchange rate misalignment rather than exchange rate volatility. Indeed, exchange rate misalignment may ultimately create exchange rate volatility (Grossmann & Orlow, 2022). S. Sidiq and H. Herawati (2016), for example, say that, against the US dollar, the rupiah is undervalued during free floating exchange rate regime. Based on the Big Mac index, T. S. Nababan (2016) shows that rupiah is undervalued against the US dollar. There is the evidence that the mismatch of the rupiah as a currency is underestimated for the largest number of the observation periods (Rasbin, Ikhsan, Gitaharie & Affandi, 2021).

While adequate foreign reserves induce the exchange rate to return to the long-term equilibrium levels (Kuncoro & Santoso, 2022), the policy rate (as the main instrument in the IT regime to anchor a future inflation expectation) fails to cope with exchange rate volatility (Kuncoro, 2020). Exchange rate stabilization in Indonesia seems to put too big an emphasis on controlling foreign reserves, thus leading to neglecting the improvement of current account imbalances, ultimately resulting in persistent exchange rate volatility. The failure of market intervention to reduce exchange rate deviation from its equilibrium level is harmful towards the likelihood of currency crises (Heriqbaldi, Widodo & Ekowati, 2020).

Accordingly, there is no widespread agreement on how foreign reserves affect exchange rate volatility and a further consideration is needed. It is worth noting that most studies analyzing exchange rate volatility have ignored current account conditions. Only few studies put foreign reserves in their analytical approaches. Therefore, the exchange rate is volatile for a particular country and not necessarily always for another since both current account imbalances and foreign reserves are a country's specifics. This study fills these empirical gaps and explores the role of current account imbalances and foreign reserves on exchange rate volatility in Indonesia, one of the biggest developing countries with the IT regime.

RESEARCH METHOD AND DATA

The foregoing empirical studies on the foreign exchange market generally rely on the GARCH

model (Generalized Autoregressive Conditional Heteroscedasticity) to measure volatility. Models such as GARCH focus on estimating the conditional mean function. The mean effect is obtained by the conditional inversion of the mean. The standard deviation from the conditional mean regression is interpreted as a measure of volatility. As a result, the distributional effects are not fully characterized and covariate influences are distorted, especially when the independent variables are highly heterogeneous.

These issues seem to be relevant to current account imbalances. Indonesia's current account deficit (as many researchers have pointed out) is unsustainable and the current account imbalance will rarely return to its mean. In other words, current account imbalances do have unit roots or are nonstationary. The presence of current account data stationarity suggests that the economy can generate a future trade surplus to meet all of its external debt. The non-stationarity of the current account imbalance may result from a structural collapse and country-specific characteristics (Roubini & Wachtel, 1999).

To address this fundamental issue, some authors involve two-regime threshold cointegration (Hansen & Seo, 2002), unit roots and fractional integration (Cunado, Gil-Alana & de Gracia, 2010), and Granger causality, Johansen cointegration, ARDL (autoregressive distributed lag) bound tests, and the simultaneous equation system (Behera & Yadav, 2019), whereas others use different approaches, such as nonlinear models to capture structural breaks (Chen, 2011), regime change or threshold (Afonso, Huart, Jalles & Stanek, 2019), and vector autoregression (Jin, Wang & Zhao, 2021). Cointegrating regression analysis is also employed to solve those econometric obstacles (Ozdamar, 2015) but with divergent results.

A. Y. Huang, S-P. Peng, F. Li and C-J. Ke (2011) and Ü. O. Tümtürk (2022) employ quantile regression to forecast exchange rate volatility without incorporating the current account balance or foreign reserves in their analytical models. The application of quantile regressions in the current account balance and foreign reserves analysis offers some advantages. Quantile regression produces a robust estimator even if the set data on the dependent variable contain some outlier observations. Quantile regression is also a good choice when the set data observations suffer highly heterogeneous conditions. Quantile regression can yield the unique estimator for each quantile. It is therefore possible to assess the position of established data on the distribution of the dependent variables with the most effective policy choices available.

Current account balances have deteriorated in terms of currency depreciation as developing countries have not taken steps to stimulate export growth and are heavily dependent on imports, such as Indonesia (Kandil, 2009). G. Adler, K. S. Chang and Z. Wang (2021) emphasize the fact that monetary authorities with the dual goals of the IT and exchange rate stability make foreign exchange reserves more inclined to exceed the exchange rate. They imply that most unconditional exchange rate volatility distributions are typically right-skewed. Right-skewed exchange rate volatility and a pervasive current account imbalance and foreign reserves distributions suggest that the corresponding coefficient increases with quantiles, which further implies that the impact of the current account imbalance and foreign reserves on exchange rate volatility is greater for upper quantiles.

Unconditional quantile regression models can be applied to examine the volatility of the exchange rate (Koenker & Bassett, 1978). The exchange rate refers to the real term (*RER*):

$$RER_t \frac{ER_t}{P_t} \tag{1}$$

Real exchange rate volatility (*XV*) is assumed to be affected by the current account balance (*CA*), foreign reserves (*FR*), and other control variables (*Z*):

$$XV_t = a + b\, ca_t + c\, fr_t + d\, Z_t + \varepsilon_t \tag{2}$$

where the lower-case represents the ratio to the GDP and ε is the disturbance term.

Real exchange rate volatility is the standard deviation divided by its mean. Each variable is calculated by

moving the average for the 12 consecutive months:

$$XV_t = \sqrt{\frac{\sum_i^{12} (RER_i - \overline{RER})^2}{n-1}} \div \overline{RER} \quad (3)$$

The coefficients *a*, *b*, *c*, and *d* are the unknown parameters to be estimated for various quantile values. The signs *b* and *c* are expected to be negative, the other coefficients also potentially negative or positive. By changing the quantile value from 0 to 1, it is possible to conditionally see the full distribution of the explanatory variables across the regressors.

The current account balance could be a deficit, a balance, or a surplus. The current account balance is rarely met in the real world. The deficit and surplus states have different impacts on exchange rate volatility. In line with B. E. Hansen and B. Seo (2002), unconditional exchange rate volatility is estimated by splitting up the current account balance into a deficit and a surplus:

$$d_1 = \begin{matrix} 1 - if\ ca_t > 0 \\ 0 - if\ ca_t \le 0 \end{matrix} \text{ and } d_2 = \begin{matrix} 1 - if\ ca_t < 0 \\ 0 - if\ ca_t \ge 0 \end{matrix} \quad (4)$$

where *d* is a dummy variable. Substituting (4) for (2), it follows that:

$$XV_t = a + b_1 \left[d_1 \times ca_t \right] + b_2 \left[d_2 \times ca_t \right] + c\ fr_t + d\ Z_t + \varepsilon_t \quad (5)$$

The symmetric impact of the deficit and surplus states ($b_1 = b_2$) on exchange rate volatility can be exerted using the Wald test. To solve the asymmetric and nonlinearity problems often arising on financial markets and being comparable to the GARCH method, refer to Equation (5).

Similarly to (4), a tolerable current account imbalance ratio can also be set, let us say *l* percent is set as the threshold:

$$d_3 = \begin{matrix} 1 - if\ ca_t > l_1 \\ 0 - if\ ca_t \le l_1 \end{matrix} \text{ and } d_4 = \begin{matrix} 1 - if\ ca_t < l_2 \\ 0 - if\ ca_t \ge l_2 \end{matrix} \quad (6)$$

and then

$$XV_t = a + b_1 \left[d_3 \times ca_t \right] + b_2 \left[d_4 \times ca_t \right] + c\ fr_t + d\ Z_t + \varepsilon_t \quad (7)$$

Because the focus is on volatility, reliable long-term historical data on current account balances, exchange rates, and international reserves are needed. The exchange rate is the US dollar price against the local currency (the Indonesian rupiah). Current account balances record a country's transactions with the rest of the world, primarily its net trade in goods and services, as well as its net income from cross-border investments and payments, and its net transfer over a period of time. Current account balances are stated in millions of US dollars. The international reserve basket contains various foreign financial assets under control of the Central Bank. Denominated in millions of US dollars, it can be used to finance any balance of payments.

The GDP is also stated in millions of US dollars. The real term of the exchange rate is converted from the price levels that deal with the CPI (consumer price index, 2012 = 100). Transforming exchange rate volatility into a real term means that our model inherently incorporates the inflation rate. In a similar fashion, dividing current account imbalances and foreign reserves by the GDP means that our model inherently takes into account growth rates (Figure 1). The sample periods range from 2005(M7) to 2021(M12), capturing the IT regime adoption. The total observations include 198 sampling points. All monthly data were obtained from Bank Indonesia, whereas the other data were obtained from the IMF.

RESULTS AND DISCUSSION

All the variables of interest are summarized in Table 1. The descriptive statistics indicate that each mean is close to the corresponding median. The close proximity of the mean to the midpoint value indicates that all the considered variables are normally distributed. While the real exchange rate volatility to reserves ratio peaks and troughs are relatively small, the data about the current account series vary to a great extent. The high variability of the current account balance is supported by the high standard deviation around its mean.

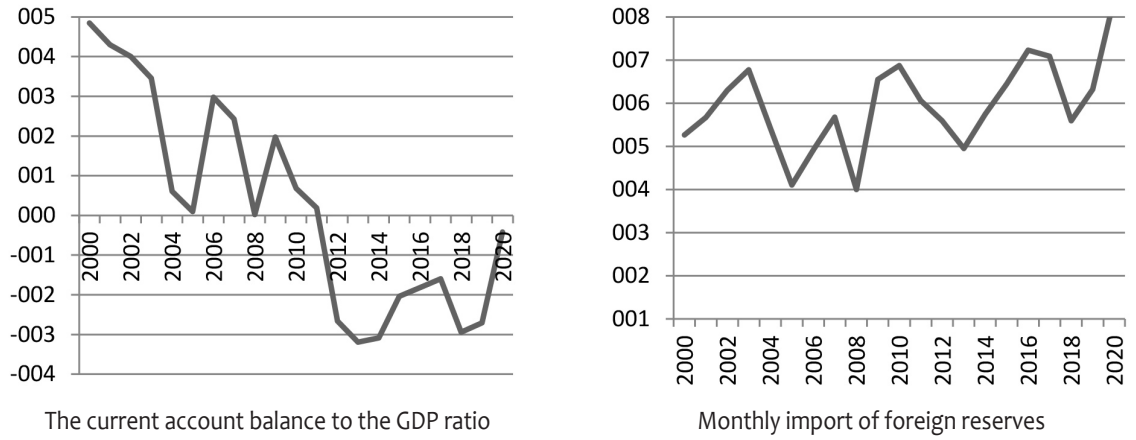

Figure 1 The current account balance and foreign reserves in Indonesia

Source: Authors

Separating the current account imbalance into a deficit and a surplus offers a clearer explanation about the source of that variability. The biggest portion of the current account imbalance over the period of observation is not equitably distributed. The current account surplus and deficit are evident in 75 and 123 cases, respectively. The mean value of the deficit is also slightly higher than that of the surplus. Moreover, the biggest portion of the current account deficit values are stationed in the lower tail, as is indicated by the negative value of skewness. High current account volatility is a common feature of many developing countries (Kandil, 2009).

The non-zero skewness value indicates that all the series data are asymmetrically distributed. For example, the bottom of the foreign reserve distribution is thicker than the top of it. Also, the kurtosis coefficient is greater than 3. This indicates that the shape of the real exchange rate volatility to foreign reserves ratio distributions are sparser (moderate) than the normal distribution. The synchronous distributions among the current account, foreign reserves, and the exchange rate volatility series data raise plausible questions about how closely related they are.

Table 1 The descriptive statistics

	XV	ca	ca > 0	ca < 0	fr
Mean	0.0362	-0.0073	0.0175	-0.0224	0.0141
Median	0.0300	-0.0107	0.0165	-0.0214	0.0140
Maximum	0.1025	0.0567	0.0567	-0.0002	0.0189
Minimum	0.0060	-0.0597	0.0000	-0.0597	0.0103
Std. Dev.	0.0237	0.0231	0.0135	0.0120	0.0012
Skewness	1.3153	0.3932	0.9445	-0.6468	0.2070
Kurtosis	4.0066	2.6907	3.5178	3.4438	4.2826
Jarque-Bera	65.4469	5.8908	11.9877	9.5852	14.9853
Probability	0.0000	0.0526	0.0025	0.0083	0.0006
Observations	198	198	75	123	198

Source: Authors

To assess the pattern of the harmonic movement among exchange rate volatility, foreign reserves, and the current account balance, the correlation matrix is calculated as shown in Table 2. The opposite synchronous pattern is between the reserves and real exchange rate volatility (-0.18), whereas the correlation between the current account balances and real exchange rate volatility is pairwise positive (0.47). Based on these figures, real exchange rate volatility can be said to be tied to the current account dynamics. Since the current account balance is deficit-dominated, real exchange rate volatility is more directly related to growing current account deficits. They will be explored in more detail using econometric methods, as discussed in the previous section.

Table 2 The correlation matrix

	XV	ca	fr
XV	1.0000	0.4707	-0.1843
ca	0.4707	1.0000	-0.0205
fr	-0.1843	-0.0205	1.0000

Source: Authors

Does a high current account imbalance variability imply stationarity? Does relatively low instability in foreign reserves and real exchange rate volatility pretend to be non-stationary? Table 3 performs the Augmented Dickey-Fuller (ADF) and ADF with structural breaks unit roots test results for the basic series data. The null hypothesis that there is a unit root can be rejected for each variable, which implies that the series data are stationary. This implies that all the variables are integrated in the order of zero (*I(0)*).

The same test is applied to the first-difference series data. Structural breaks are found in 2007, 2008, and 2011. High current account imbalance variability arose in 2007 in accordance with the peak of the commodity boom. As a natural resource exporting country, the peak commodity boom triggered foreign exchange reserves. However, the foreign exchange reserves dropped in 2011, when the current account balance began to be a deficit. The high volatility of the real exchange rate in 2008 took place in connection with the Global Financial Crisis of 2008. The capital outflows induced a lack of foreign exchange in the domestic financial market, resulting in the nominal exchange rate being sharply depreciated.

Table 3 The unit roots test

	Level		First-difference		
	t-stat	Prob.	t-stat	Prob.	Break point
XV	-3.3005	0.0161	-9.0339	< 0.01	2008M11
ca	-2.9193	0.0449	-13.5492	< 0.01	2007M01
fr	-4.6661	0.0001	-16.1140	< 0.01	2011M12

Source: Authors

Although there is a structural rupture in all the series data, the null hypothesis that there is a unit root in the time series for each variable can be rejected at the 5% or even 1% significance level. These stationary series data tests are important in order to ensure that the analytical model is an error-free regression and produces time-invariant estimates. They also suggest that the impact of the shock disappears over time and that the data for the three series evolve towards the long-term average. Ultimately, the three variables tend to approximate the long-term equilibrium relationship predicted by the related theory.

Different results are obtained for the foreign reserves. The coefficient of foreign reserves is found to be negative and significant only for the upper quantiles. The coefficients *c* in the quantiles of 0.50, 0.75, and 0.90 in the conditional median are statistically significant (Table 4). The quantile process estimate shows an upward linear trend. The higher foreign reserves stockpiling, the lower exchange rate volatility. This result is similar to many researchers' findings, as is highlighted in the review of the empirical literature section. They suggest that the efficacy of foreign reserves accumulation is different depending on the degree of real exchange rate volatility.

Separating the current account imbalances with respect to the surplus and the deficit as specified in Equation (4) generates an interesting result. As presented in Table 5, the regression results display

that the current account deficit ratio ($ca < 0$) affects the real exchange rate volatility for all quantiles. Surprisingly, the current account surplus ($ca > 0$) provokes real exchange rate volatility, in particular the quantiles 0.75 and 0.90, which is consistent with the studies of S. T. Jawaid and S. A. Raza (2013) and D. K. Das (2016). Compared to those studies, this study empirically proves that the impact of the current account deficit shows an upward linear trend throughout the unconditional real exchange rate volatility distribution.

A similar result is obtained for the foreign reserves. The stock of foreign reserves lowers exchange rate volatility in the higher quantiles, primarily in the quantile 0.75. This result confirms the study by E. Hansen and M. Morales (2019). The impact of the foreign reserves is stronger when the real exchange rate suffers high volatility rather than low volatility. In addition, most symmetric tests infer that there is no different effect of the deficit and surplus countries on real exchange rate volatility. Hence, the effectiveness of the availability of foreign reserves differs depending on the degree of accumulation. Considering each current account imbalance state, this allows the Central Bank or the monetary authority to further achieve optimal foreign reserves.

Furthermore, imposing two percent as a tolerable threshold for the current account deficit ratio as in Equation (7) provides an optimal level. As depicted in Table 6, the impact of a more than two percent current account deficit ratio could lower real exchange rate volatility by about 0.8 basis points in the top 10 percent of the distribution. This finding supports the study by M. N. Nugroho *et al* (2014). While they show that the exchange rate at level will drop after a current account deficit exceeding the threshold of the

Table 4 The estimation results of the simple quantile regression

	Quantile				
	0.10	0.25	0.50	0.75	0.90
C	0.05*	0.05**	0.07***	0.09***	0.13***
ca	0.19***	0.18**	0.31***	0.66***	0.87***
fr	-2.23	-1.72	-2.58**	-2.68*	-3.91***
Pseudo R^2	0.04	0.06	0.08	0.18	0.30
Adj R^2	0.03	0.05	0.07	0.17	0.29
S.E.R	0.03	0.03	0.02	0.02	0.04

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; S.E.R. denotes Standard Errors Residuals

Source: Authors

Table 5 The estimation results of the extended quantile regression

	Quantile				
	0.10	0.25	0.50	0.75	0.90
C	0.06***	0.05**	0.07***	0.10***	0.10***
ca < 0	0.48***	0.28*	0.29**	0.42***	0.66***
ca > 0	-0.14	0.06	0.36	1.14***	1.52***
fr	-2.65*	-1.78	-2.50*	-3.61**	-2.34*
Pseudo R2	0.06	0.06	0.08	0.20	0.31
Adj R2	0.05	0.05	0.06	0.19	0.30
S.E.R	0.03	0.03	0.02	0.02	0.04
Symmetric	No**	Yes	Yes	No**	Yes

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; S.E.R denotes Standard Errors Residuals

Source: Authors

Table 6 The estimation results of the threshold quantile regression

	Quantile				
	0.10	0.25	0.50	0.75	0.90
C	0.05**	0.05**	0.08***	0.09***	0.08***
ca < -0.02	0.47***	0.41***	0.34***	0.43***	0.80***
-0.02 < ca < 0	0.78***	0.93***	0.78***	0.91***	2.03***
ca > 0	-0.22	-0.19	0.28	1.05***	1.22*
fr	-2.10	-1.65	-2.73**	-2.82**	-0.73
Pseudo R^2	0.08	0.09	0.09	0.21	0.34
Adj R^2	0.06	0.07	0.07	0.20	0.32
S.E.R	0.03	0.03	0.02	0.02	0.04
Symmetric	No**	No*	Yes	No***	No***
Slope equality test	Quantile	0.25	0.50	0.75	0.90
	0.10	2.12	5.03	34.47***	55.95***
	0.25		4.83	32.72***	53.17***
	0.50			14.95***	37.97***
	0.75				20.64***

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; S.E.R denotes Standard Errors Residuals

Source: Authors

two percent of the GDP, this paper is more concerned with volatility.

Allowing the current account deficit ratio to be no less than two percent of the GDP could lower real exchange rate volatility by about 2.03 basis points in the top 10 percent of the distribution. Meanwhile, the current account surplus tends to induce real exchange rate volatility. It seems that the 'fear of capital mobility' (Steiner, 2013) works together with the 'fear of appreciation' (Levy-Yeyati *et al*, 2013). Foreign exchange market players are sensitive to the foreign reserve stock. At the same time, capital needs and/or capital inflows to finance current account deficits also make foreign exchange market participants responsive to the local currency appreciation.

Accordingly, the Central Bank's target of maximum two percent Indonesia's current account deficit to GDP ratio is justified here. The current account deficit ratio no lower than two percent seems to be desired. In this position, the existing stock of the foreign reserves enables it to maintain the exchange rate against instability. Moreover, the symmetry test results show that the slope coefficients are quite different. The slope coefficients substantially differ across the 0.75th and 0.90th pairwise quantiles, implying that adequate foreign reserves are required to overcome the excessive exchange rate volatility induced by the current account imbalances.

It is also necessary to test whether the results of the simple model are equal to the extended models that incorporate the classification of the current account imbalances. Table 6 also presents the Wald test for the equality of slope coefficients across the quantiles. Obviously, there are some different slope coefficients across quantiles. All the slope coefficients in the quantiles 0.75 and 0.90 pairwise substantially differ from the others, as is found in the individual symmetric tests. These results show that the different slope coefficients are not only intra-quantile but inter-quantile coefficients as well.

Overall, the sign, magnitude, and significance of the current account imbalances and foreign reserve coefficients do not substantially alter. The current account imbalances and the stock of foreign reserves successfully explain the dynamics of exchange rate volatility. Although there is a structural break, real

exchange rate volatility remains predictable with respect to the disequilibrium process. Therefore, the conclusions presented in this paper are robust independently of the control variables to be added in the econometric model.

CONCLUSION

This paper aims to evaluate the impact of current account imbalances and foreign reserves availability on real exchange rate volatility in the IT regime. To the best of the authors' knowledge, this study could be considered as a pioneer investigating the effectiveness of the IT regime to curb exchange rate volatility by connecting it to current account imbalances and foreign reserves. Considering the case of Indonesia over the period from 2005(7) to 2021(12), the results of quantile regression show that the current account imbalance enhances exchange rate fluctuations, and that the availability of foreign exchange reserves moderates exchange rate volatility. Thus, the hypotheses H1 and H2 can be accepted. It is also found that the coefficients of the two main macroeconomic variables tend to increase linearly. The estimate of the regression quantile is greater at higher quantiles than at lower quantiles.

Current account imbalances differently affect real exchange rate volatility. The quantile process estimates for the deficit state are significantly lower than those for the surplus states. However, allowing the current account deficit ratio to be no less than 2 percent of the GDP has a greater effect on the upper quantile of the real exchange rate volatility distribution. This confirms the third hypothesis. The corresponding slope coefficient can be interpreted as the increasing effect of both variables on exchange rate volatility. In this position, capital and/or financial inflows enable keeping the exchange rate against instability.

Given the different effect of current account imbalances on real exchange rate volatility holds not only intra-quantile but also inter-quantile, improving external competitiveness should be an integral part of the macroeconomic stabilization policy. Current account imbalances will stimulate imported inflation. It then seriously boosts the domestic inflation rate and thereby ruins the credibility of the IT monetary policy. Foreign reserves accumulation generated from capital and/or financial inflows can control exchange rate volatility. Accordingly, the optimal stock of foreign reserves might avoid imposing dual goals of IT and exchange rate stability.

The issue of current account imbalances and foreign reserves in relation to exchange rate volatility is open to reinvestigation. The current account imbalances (i.e. the deficit and the surplus) referred to in this study are treated as a discrete variable. Further research is advisable to accommodate continuous change in current account imbalances. Since exchange rate fluctuations consist of both appreciation and depreciation, the distinction of changes in foreign reserves to accommodate each state is also strongly recommended. Eventually, those methodological improvements allow the implementation of the better-specified monetary policies oriented towards minimizing the economy's vulnerability to external shocks in the IT regime.

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Received on 26th February 2023,
after two revisions,
accepted for publication on 21st April 2023.
Published online on 27th April 2023.

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DEBALANSI TEKUĆEG RAČUNA I NESTABILNOST DEVIZNOG KURSA: EMPIRIJSKI DOKAZI IZ INDONEZIJE

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Pitanje da li makroekonomska kretanja utiču na nestabilnost deviznog kursa na novonastajućim tržištima sa režimom ciljanja inflacije predstavlja veliki izazov. U ovom radu, razmatraju se uticaji debalansa tekućeg računa i deviznih rezervi na nestabilnost realnog kursa. Primenom graničnih kvantilnih regresionih modela za Indoneziju u periodu od 2005(7) do 2021(12), zaključuje se da obe promenljive igraju važnu ulogu u kontrolisanju nestabilnosti kursa. Takođe se došlo do saznanja da koeficijenti pokazuju uzlazni linearni trend. Prisutan je asimetričan uticaj bilansa tekućeg računa. Opravdana je tvrdnja da je racio deficita tekućeg računa prema BDP-u od dva procenta siguran. Asimetrično ponašanje bilansa tekućeg računa ima potencijal da inicira nestabilnost realnog kursa, podrivajući time monetarnu politiku u okviru režima ciljanja inflacije. U skladu sa tim, optimalnim zalihama deviznih rezervi može se izbeći nametanje dvostrukih ciljeva usmerenih na suzbijanje inflacije i stabilnost kursa.

Ključne reči: tekući račun, devizne rezerve, devizni kurs, asimetrični odziv, kvantilna regresija

JEL Classification: E58, F31, F32, O24

Ekonomski horizonti, Januar - April 2023, Volumen 25, Sveska 1, 35 - 53
UDC: 33 ISSN: 1450-863 X

Izvorni naučni članak
UDK: 336.221.264(497.11)
doi:10.5937/ekonhor2301035P

POSLOVNE I INSTITUCIONALNE DETERMINANTE EFEKTIVNIH PORESKIH STOPA U BANKAMA U REPUBLICI SRBIJI

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Cilj ovog rada je proučavanje uticaja izabranih poslovnih i institucionalnih determinanti na godišnje efektivne poreske stope u bankama u Republici Srbiji (RS). Regresioni modeli panel podataka primenjeni su na 113 opservacija, koje pokrivaju period 2017-2021, gde se računovodstvena i tekuća efektivna poreska stopa koriste kao mera stvarnog poreskog opterećenja. Rezultati pokazuju da je efektivna poreska stopa u bankama u RS znatno ispod zakonskog nivoa. Dalje, za svaki skup podataka, izračunati su koeficijenti promena efektivne poreske stope, a najadekvatniji model biran je koristeći Hausman-ov i Breusch i Pagan-ov test. U prvom modelu, najveća promena efektivnih poreskih stopa je uzrokovana promenom leveridža, procesom merdžera i akvizicija i veličinom banke. Prisustvo rezervisanja za kreditne gubitke u modelu u potpunosti naglašava uticaj profitabilnosti i leveridža. Konačno, u poslednjem modelu, banke sa dobitkom pre oporezivanja mogu da upravljaju efektivnim poreskim stopama i poreskim opterećenjima putem regulisanja nivoa kapitalizacije. Rezultati ove studije su od interesa za ekonomiste i menadžere u bankama, pomažući im u efikasnom poreskom planiranju i upravljanju rezultatima.

Ključne reči: poresko opterećenje, efektivna poreska stopa, leveridž, rezervisanja za kreditne gubitke, kapitalizacija, profitabilnost

JEL Classification: G21, H21

UVOD

Tema oporezivanja dobiti postaje sve značajnija u kontekstu prihoda i rashoda koji se priznaju u poreskom bilansu i determinanti koje utiču na efektivnu poresku stopu, posmatrano kroz koncept poreskog planiranja u funkciji upravljanja rezultatima banke. Efektivna poreska stopa otkriva stvarni nivo poreskog opterećenja banke i odražava politiku upravljanja prihodima i rashodima. To je posebno naglašeno u zemljama sa dvostrukim sistemom izveštavanja, gde je svaki privredni subjekat, pa i banka, dužan da priprema i dostavlja finansijske izveštaje kao i poreski bilans, čime se stvara mogućnost korekcije računovodstvenih rezultata. U tim zemljama je izvesno da će banke imati nižu stopu u odnosu na onu koja se utvrđuje na nivou države. Takođe, s

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obzirom na ključnu ulogu banaka u finansijskom sistemu jedne zemlje, posebno izraženu u uslovima krize, zemlje stimulišu svoje poslovanje, na način da banke uživaju dodatna poreska oslobođenja u odnosu na kompanije iz privatnog sektora. U Republici Srbiji (RS) se oporezivanje dobiti banaka razlikuje od oporezivanja preduzeća privatnog sektora u pogledu propisa o maloj kapitalizaciji, otpisu potraživanja po kreditima i poreskom tretmanu vanbilansnih plasmana (Vržina, 2018). Treba napomenuti i razlike u poreskom tretmanu, s obzirom na multinacionalne banke, koje otvaraju svoje kancelarije u zemljama sa niskim porezima poput RS koriste različite vrste poreskih privilegija kao što je međugrupno kreditiranje.

Istraživanja determinanti efektivne poreske stope prvenstveno se fokusiraju na unutrašnje (tradicionalne) i eksterne (institucionalne) faktore. Istovremeno, važna je činjenica da od ukupnog broja radova postoji mali broj onih koji ispituju varijabilnost efektivne poreske stope fokusirajući se na bankarski sektor. Većina ovih analiza sprovedena je na primeru javnih ili privatnih kompanija u Sjedinjenim Američkim Državama, u Kini, Australiji ili zemljama Evropske unije.

Bez obzira na opservacije ili tip podataka korišćenih u analizi, većina determinanti efektivne poreske stope je jedinstvena za svaki poslovni subjekt. Determinanta koja je korišćena u mnogim studijama je veličina posmatrana iz ugla poreskog štita. Jedno od tumačenja je da politička komponenta značajno utiče na nisko poresko opterećenje banaka, i ona se najčešće dovodi u vezu sa velikim bankama, koje kao takve uživaju veće poreske povlastice zahvaljujući većem političkom, a samim tim i ekonomskom uticaju. Pored veličine kompanije, nivo efektivne poreske stope zavisi i od uspešnosti poslovanja kompanije, a najčešće korišćeno merilo u naučnim radovima je stopa povrata na sredstva (ROA) ili stopa prinosa na kapital (ROE). Leveridž kao determinanta je takođe bio predmet mnogih istraživača, prvenstveno u tradicionalnom kontekstu, gde veće učešće eksternih izvora finansiranja smanjuje efektivnu poresku stopu. Treba uzeti u obzir činjenicu da su promene u leveridžu ograničene usled zahteva determinisanih bazelskim kriterijumima. U novijoj literaturi, rezervisanja za kreditne gubitke se pojavljuju kao determinanta efektivne poreske stope banke. To su potencijalni otpisi potraživanja po kreditima, koji su pod kontinuiranim praćenjem zbog značajnog uticaja na rezultate banke, a samim tim i na efektivnu poresku stopu, u okviru koje se gubicima po kreditima pristupa kao budućim događajima na osnovu predviđanja i rezervisanja. O značaju ove determinante govori i to da je zakonom propisan njihov poreski tretman.

Predmet istraživanja u ovom radu je stvarno poresko opterećenje banaka na teritoriji RS, kao i analiza poslovnih i institucionalnih determinanti visine efektivnih poreskih stopa.

Shodno tome, u radu se testiraju hipoteze uticaja svake determinante pojedinačno, uz osvrt na prethodna istraživanja u ovoj oblasti.

S obzirom na navedeni fokus istraživanja, ciljevi istraživanja se odnose na: pružanje utemeljene ocene poreske politike banaka u RS kroz sagledavanje realne visine efektivnih poreskih stopa, kao i identifikaciju stepena njihove promene pod uticajem različitih determinanti, usmerenih na podsticanje efikasnog poreskog planiranja i upravljanja rezultatima.

Metodološki instrumentarijum primenjen u istraživačkom procesu podeljen je u faze spram predmeta istraživanja. Vilkokson-ov rang test korišćen je za poređenje visine efektivne poreske stope sa zakonskom, a potom je ispitivanje uticaja svake izabrane determinante na efektivnu poresku stopu vršeno pomoću panel regresionog modela, gde je ocena najadekvatnijeg modela doneta uz pomoć Hausman-ovog i Breusch-Pagan-ovog testa. Pre implementacije modela, sprovedeni su testovi za utvrđivanje odnosa među varijablama i adekvatnosti odabranih vrednosti za model, izračunavanjem faktora inflacije varijanse i multikolinearnosti.

U domaćoj literaturi je prethodnih godina objavljen manji broj radova o efektivnoj poreskoj stopi u bankama u RS, ali nijedan se ne bavi analizom njenih determinanti. Prema saznanjima autora, ovo

je prvi rad u RS u kome se analizira uticaj izabranih determinanti na efektivne poreske stope u bankama. U ovom istraživanju korišćene su dve stope kako bi se bolje razumeli i interpretirali rezultati i razlike u stopama. Pored uobičajenih determinanti efektivne poreske stope, ovaj rad ispituje uticaj pojedinih institucionalnih determinanti banaka usled njihove važnosti za bankarsko tržište RS, kao i uticaj jedne poslovne determinante podložne promeni standarda a koja je od značaja za poslovne rezultate banaka.

Rezultati istraživanja mogu biti korisni kako ekonomistima, tako i menadžerima banaka u smislu pružanja dodatnih informacija o poreskim pitanjima, a sve u cilju efikasnog poreskog planiranja. Vlasnici banaka mogu biti zainteresovane strane zbog prediktivne moći uticaja efektivne poreske stope na njihov prihod.

Ostatak ovog rada organizovan je na sledeći način. Nakon uvoda, u drugom delu se analiziraju glavne determinante efektivne poreske stope, kroz pregled literature i razvoj hipoteza koje se testiraju u radu. Treći deo govori o metodologiji empirijskog istraživanja, uključujući izbor varijabli u uzorku istraživanja. U četvrtom delu sumirani su rezultati osnovnog modela i modela sa kontrolnim varijablama, uz prikaz važnosti dobijenih indikatora u odnosu na prethodno istraživanje. Na kraju, u poslednjem delu dati su zaključci i mogućnosti za buduća istraživanja.

PREGLED LITERATURE

Poslovne determinante efektivne poreske stope

Analiza uticaja veličine banke na efektivnu poresku stopu zasniva se na dve suprotstavljene teorije koje tumače uzročno-posledični odnos ovih varijabli iz političke perspektive. S jedne strane, potvrdu hipoteze o političkim troškovima, prema kojoj velike kompanije snose veće poresko opterećenje, nalazi se u radovima autora J. L. Zimmerman (1983), F. J. Delgado, E. Fernández-Rodríguez i A. Martinez-Arias (2014), Y. M. Salaudeen i U. C. Eze (2018) i Ç. A. Hazir (2019). S druge strane, istraživači T. M. Porcano (1986), G. Richardson i R. Lanis (2007) i Y. A. Sudibyo i I. R. Bawono (2016) potvrdili su hipotezu da velike kompanije ostvaruju veće poreske uštede zbog većeg političkog uticaja i finansijskih mogućnosti. S. Vržina (2018), za period od 2013. do 2017. godine, došao je do zaključka da veće banke u RS imaju više računovodstvene i aktuelne efektivne poreske stope. Profitabilnost uglavnom prati veličinu kompanije (Delgado *et al*, 2014; Salaudeen & Eze, 2018; Hazir, 2019), što takođe ukazuje na veće poresko opterećenje uspešnijih banaka (Omer, Molloy & Ziebart, 1993; Plesko, 2003; Díaz, Rodríguez & Arias, 2011; Fernández-Rodríguez, García-Fernández & Martínez-Arias, 2021; Lazăr & Andrieș, 2022). Međutim, neki istraživači su došli do drugačijih rezultata, prema kojima će profitabilnije kompanije plaćati niži porez samo ako u toj kompaniji postoji efikasan sistem poreskog planiranja (uz kontrolu veličine preduzeća) (Rego, 2003) ili ako postoji jak politički uticaj (Ajili & Khlif, 2020).

Istraživači poput C. P. Stickney i V. E. McGee (1982), X. Liu i S. Cao (2007), O. Inua (2018) i Ç. A. Hazir (2019), potvrđuju da banke sa većim učešćem stranih izvora finansiranja, uprkos rastu leveridža, imaju povoljniji poreski tretman kamata u odnosu na dividende. S. Vržina (2019) donosi suprotan zaključak kada je reč o uticaju na godišnje efektivne poreske stope u RS, ali pokazatelj nije statistički značajan. Prema S. Gupta i K. Newberry (1997), pozitivan efekat može biti prisutan ako uzorak uključuje kompanije koje su ostvarile povrat poreza ili gubitak pre oporezivanja. Imajući ovo u vidu, autori S. Lazăr i A. M. Andrieș (2022) postavljaju hipotezu o uticaju akcionarskog kapitala banaka u Evropskoj uniji na nivo efektivne poreske stope: visok akcionarski kapital u strukturi ukupnog kapitala - nizak leveridž - visoka efektivna poreska stopa. U novijoj literaturi izučava se kretanje leveridža u uslovima konstantnih poreskih stopa i uvođenja dodatnih poreskih naknada za banke (na primer, naknade koje su uvele određene evropske zemlje). Efekat smanjenja bankarskog leveridža u takvim uslovima je prisutan samo u zemljama sa nižim poreskim stopama (Chaudhry, Mullineux & Agarwal, 2015).

Uzimajući u obzir prethodno navedena istraživanja, u radu su testirane sledeće hipoteze:

H1: Banke sa većim obimom aktive imaju višu efektivnu poresku stopu.

H2: Banke sa višim nivoom profitabilnosti imaju višu efektivnu poresku stopu.

H3: Banke sa višim nivoom leveridža (pozajmljeni kapital) imaju nižu efektivnu poresku stopu.

H4: Banke sa većim učešćem akcijskog kapitala imaju višu efektivnu poresku stopu.

Institucionalne determinante efektivne poreske stope

Neki istraživači ističu sinergijski značaj merdžera i akvizicija zbog ostvarivanja poreskih olakšica i smanjenja poreskog opterećenja (Grubert, Goodspeed & Swenson, 2007; Zelenović i Babić, 2018). Ciljane kompanije mogu postići smanjenje efektivne poreske stope u proseku za 3%, a mogu dostići i do 8%, ako preduzeće kupac sprovodi agresivnu poresku politiku (Belz, Robinson, Ruf & Steffens, 2013). Kompanije u ulozi prodavca sa ostvarenim gubitkom pre oporezivanja suočavaju se sa padom efektivne poreske stope u proseku između 6,7% i 7,9% (Duarte & Barros, 2018). Trend ukrupnjavanja bankarskog sektora u RS je započet 2001. godine a proces se aktivno odvija i dalje, u obliku strategije za rast i konkurenciju na tržištu, pa je tako prema N. Miković (2022) u periodu 2017-2021. godine proces akvizicije banaka u RS sproveden nad 15 banaka ukupno. To je 5 banaka u okviru istraživačkog uzorka obuhvaćenog u radu: Expobank preuzela Marfin banku (2017), Alta banka preuzela Jubmes banku (2019), Eurobank preuzela Direktnu banku (2021), Banka Poštanska štedionica preuzela MTS banku (2021), OTP preuzela Vojvođansku banku (2019) i Societe Generale banku (2021). AIK banka je završila proces akvizicije Sberbanke, NLB banka proces akvizicije Komercijalne banke u toku 2022. godine a akvizicija Raiffeisen banke nad RBA bankom je u toku.

Vlasnička struktura se može posmatrati na dva načina. Većina istraživanja pokazuje da će poresko opterećenje državnih preduzeća biti znatno niže zbog poreskih podsticaja (Tran & Yu, 2008; Mahenthiran & Kasipillai, 2012). Situacija je drugačija ako govorimo o bankarskom sektoru u kome dominira privatizacija kao deo finansijske integracije i razvoj bankarskog tržišta, čime je broj državnih banaka veoma mali. U bankarskom sektoru RS od 31. decembra 2021. godine aktivno posluju dve banke u državnom vlasništvu (Poštanska štedionica i Srpska banka), dok je 21 banka u većinskom privatnom vlasništvu. S druge strane, banke sa poreklom kapitala u stranim zemljama, sele svoje poslovanje u zemlje sa nižim poreskim opterećenjem i ostvaruju poreske uštede u povoljnom poslovnom okruženju (Huizinga & Nicodème, 2006). Drugačije tvrde S. Claessens, A. Demirgüç-Kunt i H. Huizinga (2001), čije je istraživanje na uzorku nacionalnih i inostranih banaka iz 80 zemalja u periodu od 1988. do 1995. godine pokazalo da strane banke snose veće poresko opterećenje u industrijama u razvoju. Na bankarskom tržištu RS dominiraju strane banke, 17 banaka od 23, što je ukupan broj banaka koje su poslovale na dan 31. decembra 2021. godine, sa učešćem od 83% u ukupnoj aktivi.

Uzimajući u obzir prethodno navedena istraživanja, u radu su testirane sledeće hipoteze:

H5: Procesi merždera i akvizicija u bankama smanjuju efektivnu poresku stopu.

H6: Procesi privatizacije u bankama smanjuju efektivnu poresku stopu.

H7: Povećanje učešća stranog kapitala u bankarskom sektoru smanjuje efektivnu poresku stopu.

Kontrolne determinante

N. Bayraktar i Y. Wang (2004) navode da prisustvo stranih banaka značajno određuje nivo rezervisanih kreditnih gubitaka. Ova stavka dobija na značaju usvajanjem novog Međunarodnog standarda finansijskog izveštavanja (MSFI) broj 9 - Finansijski instrumenti. Njegova primena u bankama u RS počela je 1. januara 2018. godine (Narodna banka Srbije, 2017), u skladu sa Zakonom o porezu na dobit pravnih lica. Kako rashodi po osnovu rezervisanja za kreditne

gubitke predstavljaju poreski osetljivu kategoriju, njihov efekat će se direktno odraziti na smanjenje efektivne poreske stope. Istraživanje S. Lazăr i A. M. Andrieș (2022) potvrđuje negativnu vezu između ove dve varijable. U ovom radu se pretpostavlja da rezervisanja za kreditne gubitke dovode do smanjenja efektivne poreske stope.

V. Todorović, J. Bogićević i S. Vržina (2019) ukazuju na važnost uključivanja banaka sa gubicima pre oporezivanja u analizu (te banke mogu imati obavezu poreza na dobit ili preneti gubitke iz prethodnih godina i smanjiti poreske obaveze). S obzirom na navedeno, istraživači S. Gupta i K. Newberry (1997), Ç. A. Hazir (2019) i S. Lazăr i A. M. Andrieș (2022) uključuju kompanije sa gubitkom pre oporezivanja u analizu ograničavanjem vrednosti obračunate efektivne poreske stope, pri čemu je niža vrednost 0% za kompanije koje su uprkos negativnom rezultatu imale povrat poreza i gornju vrednost stope od 100% za preduzeća koja su platila porez i ostvarila negativan rezultat, sa ciljem obezbeđivanja adekvatnih podataka u uzorku.

PODACI I METODOLOGIJA ISTRAŽIVANJA

Podaci i izbor uzorka

Uzorak čine 23 poslovne banke aktivne na kraju 31. decembra 2021. godine, a predmet analize je petogodišnji period, od 2017. do 2021. godine. Spisak banaka je prikazan u Prilogu.

U radu su korišćeni javno dostupni podaci o bankama sa zvaničnog sajta Narodne banke Srbije i podaci iz finansijskih izveštaja sa zvaničnih sajtova banaka. Podaci o rezervisanju za kreditne gubitke nalaze se u Napomenama uz finansijske izveštaje, odeljak Upravljanje rizicima, stavka Kreditni rizik, kategorija „krediti i potraživanja od klijenata". Rezervisanja za gubitke po kreditima se smatraju zbirnim za sva tri nivoa.

Za ovo istraživanje formiran je neuravnotežen (nebalansiran) panel podataka sa 113 opservacija, od kojih je kod 94 ostvaren dobitak pre oporezivanja, a preostale su opservacije sa gubitkom pre oporezivanja. Neuravnotežen panel proizilazi iz činjenice da istraživanjem nisu obuhvaćeni podaci za OTP banku (ranije: Societe Generale banka a.d. Beograd) za 2018. i 2017. godinu, s obzirom da finansijski izveštaji za navedene godine nisu bili dostupni na sajtu u momentu realizacije predmetnog istraživanja. Neuravnotežen panel nije preferiran model u literaturi imajući u vidu određena ograničenja njegove primene poput nemogućnosti sprovođenja analize jedne jednice u svakom vremenskom periodu koji je predmet istraživanja. Iz toga proizilazi ograničena mogućnost sprečavanja uticaja heterogenosti neke jedinice na rezultate, a ujedno izaziva pristrasnost modela prema jednoj klasi umesto objektivnog sagledavanja celog skupa opservacija.

Istraživački model

U ovom radu se efektivna poreska stopa koristi kao mera poreskog opterećenja i ujedno kao zavisna varijabla. U teoriji, preporučuje se korišćenje više efektivnih poreskih stopa u analizi (Omer, Molloy & Ziebart, 1991).

Naime, prva zavisna varijabla korišćena u ovom istraživanju je računovodstvena (ukupna) efektivna poreska stopa (u radu EPS 1). S. Vržina (2018) koristi ovu stopu kao meru poreskog opterećenja. U skladu sa Međunarodnim računovodstvenim standardom 12, „Porezi na dohodak", računovodstvena (ukupna) efektivna poreska stopa je data u nastavku:

$$\text{Prosečna godišnja računovodstvena efektivna poreska stopa} = \frac{\text{poreski rashod (prihod)}}{\text{računovodstvena dobit}} \quad (1)$$

gde je poreski rashod (prihod) ukupan iznos poreza koji se sastoji od tekućeg poreza za tekući obračunski period, kome se dodaje gubitak od smanjenja odloženih poreskih sredstava i stvaranja odloženih poreskih obaveza, i/ili od kojih se oduzima dobitak od stvaranja odloženih poreskih sredstava i smanjenja odloženih poreza; računovodstvena dobit predstavlja

dobitak ili gubitak za period pre odbitka poreskog rashoda.

Realnija mera u obračunu poreskog opterećenja je tekuća efektivna poreska stopa (u radu EPS 2). Otklanja uticaj trajne razlike između računovodstvenog i oporezivog prihoda, stavljajući tekući poreski rashod u odnos prihoda pre oporezivanja.

$$\text{Prosečna godišnja tekuća efektivna poreska stopa} = \frac{\text{tekući poreski rashod (prihod)}}{\text{računovodstvena dobit}} \quad (2)$$

gde je rashod (prihod) tekućeg poreza iznos poreza plaćen u tekućem obračunskom periodu; računovodstvena dobit predstavlja dobitak ili gubitak za period pre odbitka poreskog rashoda.

U radu se ispituje uticaj nezavisnih varijabli (determinanti) na efektivnu poresku stopu, a podela na poslovne i institucionalne izvršena je u skladu sa referentnom literaturom iz ove oblasti. Odnos između nezavisnih i zavisnih varijabli u ovom radu može se tumačiti korišćenjem prediktivnih znakova, što je prikazano u Tabeli 1. Model uključuje i kontrolnu varijablu Rezervisanja za gubitke po kreditima.

Istraživački deo rada organizovan je u tri dela, u okviru primenjene metodologije i ciljeva istraživanja.

- Za izračunavanje efektivne poreske stope koriste se dva različita modela, gde su određene vrednosti modelirane na 0% i 100% (na osnovu istraživanja S. Gupta i K. Newberry (1997) i Ç. A. Hazir (2019). Vrednosti efektivne poreske stope svake godine upoređuju se sa zakonskom poreskom stopom korišćenjem Vilkokson-ovog rang testa (primenjenog u istraživanju S. Vržine (2018)), kako bi se utvrdile razlike i izračunalo stvarno poresko opterećenje banaka. Zasnovano je na hipotezi da postoji statistički značajna razlika između zakonske i efektivne poreske stope.
- Izračunava se uticaj odabranih determinanti na efektivnu poresku stopu, kao i nivo promena koje određuju rast ili smanjenje poreskog opterećenja banaka. Hipoteze se testiraju korišćenjem modela panel regresije - Model običnih najmanjih kvadrata, Model fiksnih efekata i Model slučajnih efekata, za obe vrste efektivne poreske stope. Odluka o primeni odgovarajućeg modela za svaku grupu podataka u analizi doneta je korićenjem Durbin-Wu-Hausman-ovog testa i po potrebi Breusch-Pagan-ovog testa, kako je primenjeno u istraživanju S. Gupta i K. Newberry (1997).
- Robusnost rezultata se proverava promenom varijabli i promenom opservacija. Prvi test u uzorak uvodi nezavisnu varijablu "rezervisanja za gubitke po kreditima", a drugi test isključuje banke sa gubicima pre oporezivanja iz uzorka. Ocenjuje se razlika u rezultatima u odnosu na originalne.

Model koji se koristi za izračunavanje uticaja determinanti na efektivne poreske stope dat je u jednačini 3:

Tabela 1 Nezavisne varijable i prediktivni znak

Determinante (varijable)		Mera	Znak
poslovna	Veličina (VEL)	Prirodni logaritam ukupne aktive (u 000 RSD)	+
poslovna	Leveridž (LEV)	(Dobit pre oporezivanja / Ukupna imovina) x 100	-
poslovna	Profitabilnost (ROA)	(Ukupne obaveze / Ukupna imovina) x 100	+
poslovna	Kapitalizacija (KAP)	(Akcionarski kapital / Ukupna imovina) x 100	+
institucionalna	Merdžeri i akvizicije (M&A)	Banka koja je učestvovala u procesu (kupac) 1, u suprotnom 0	-
institucionalna	Proces privatizacije (PB-DB)	Privatna banka 1, Državna banka 0	-
institucionalna	Učešće stranog kapitala (NB-IB)	Nacionalna banka 1, Inostrana banka 0	-
kontrolna	Rezervisanja za kreditne gubitke (REZ)	(Rezervisanja/Ukupna sredstva) x 100	-

Izvor: Autor

EPS_{it1} ili $EPS_{it2} = \beta_0 + \beta_1 \, x \, VEL_{it} + \beta_2 \, x \, LEV_{it} + \beta_3 \, x \, ROA_{it} + \beta_4 \, x \, KAP_{it} + \beta_5 \, x \, M\&A_{it} + \beta_6 \, x \, PB\text{-}DB_{it} + \beta_7 \, x \, NB\text{-}IB_{it} +$ *veštačka varijabla za godine* $+ \varepsilon_{it}$ (3)

gde *i* predstavlja banku, *t* predstavlja godinu u periodu od 2017-2021, a β označava regresioni koeficijent. Zavisna promenljiva može biti EPS_{it1} (računovodstvena efektivna poreska stopa) ili EPS_{it2} (tekuća efektivna poreska stopa).

Podaci se statistički obrađuju korišćenjem računarskog softvera STATA, verzija 13.0, dok se nivoi pouzdanosti $\alpha = 0{,}05$ koriste za određivanje statističke značajnosti.

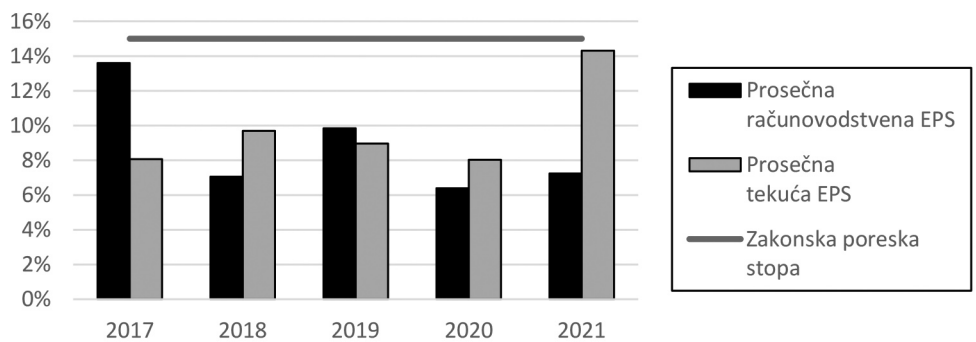
REZULTATI ISTRAŽIVANJA I DISKUSIJA

Izračunavanje efektivne poreske stope

Izračunavanje poreskog opterećenja banaka u RS za posmatrani period 2017-2021. pokazuje da su računovodstvena i tekuća efektivna poreska stopa kontinuirano ispod zakonske poreske stope, iako je evidentan blagi trend rasta. U skladu sa navedenim, 96% banaka imalo je nižu računovodstvenu efektivnu poresku stopu (107 opservacija od ukupno 113 u uzorku), kao i nižu tekuću efektivnu poresku stopu (108 opservacija od ukupno 113 u uzorku) u odnosu na zakonsku poresku stopu. Rezultati su predstavljeni na Slici 1. Prosečne stope su izračunate za čitav skup opservacija u posmatranom periodu, uzimajući u obzir modelirane vrednosti efektivne poreske stope korišćene u radu.

Aritmetička sredina obe efektivne poreske stope je značajno ispod zakonske sem u dve godine (prosečna računovodstvena efektivna poreska stopa u 2017. godini je 13,59%, a prosečna tekuća efektivna poreska stopa u 2021. godini je 14,30%). Ako bi se izostavio uticaj dve banke koje su, uprkos gubitku, plaćale porez u svim godinama (zbog modelirane efektivne poreske stope u visini od 100%), prosečna tekuća poreska stopa bila bi na znatno nižem nivou, s obzirom da je 10 banaka u 2021. prijavilo tekući porez na nivou od 0% u svojim bilansima.

U Tabeli 2 prikazani su rezultati deskriptivne statistike. Kako u uzorku za svaku godinu postoji jedna banka sa efektivnom poreskom stopom od 0%, minimalna vrednost stope je nula. Trenutna efektivna poreska stopa dostiže maksimalnu vrednost od 100% u svim godinama, što ukazuje da je u toku svake godine postojala najmanje jedna banka sa ostvarenim gubitkom pre oporezivanja, pa je za takve slučajeve u radu efektivna poreska stopa modelirana na 100%. Maksimalna vrednost računovodstvene efektivne poreske stope odstupa od 100% za tri godine, kada su dve banke, uprkos gubitku pre oporezivanja, ostvarile poreski prihod (API banka i Mobi banka) i kada je ukupna poreska stopa iskazana kao 0% (Mobi Banka). Zbog odsustva normalne distribucije podataka,



Slika 1 Trend računovodstvenih i tekućih efektivnih poreskih stopa u odnosu na zakonsku poresku stopu

Izvor: Autor

Tabela 2 Deskriptivna statistika i Vilkokson-ov test efektivnih poreskih stopa

Panel A. Opservacije sa računovodstvenom efektivnom poreskom stopom							
Godina	*n*	SD	Medijana	Srednja vrednost	Min	Maks	Z (Vilkokson)
2017	23	28,115	1,035	13,599	0,000	100,000	-2,530[b]
2018	23	8,010	4,235	7,061	0,000	30,370	-3,108[b]
2019	23	21,361	0,000	9,848	0,000	100,000	-2,877[b]
2020	22	8,325	2,850	6,394	0,000	33,280	-3,409[b]
2021	22	6,522	6,850	7,248	0,000	19,320	-3,845[b]
Panel B. Opservacije sa tekućom efektivnom poreskom stopom							
Godina	*n*	SD	Medijana	Srednja vrednost	Min	Maks	Z (Vilkokson)
2017	23	21,270	0,010	8,069	0,000	100,000	-3,311[b]
2018	23	21,254	0,345	9,740	0,000	100,000	-3,158[b]
2019	23	21,046	0,070	8,968	0,000	100,000	-3,235[b]
2020	22	20,859	0,000	8,033	0,000	100,000	-3,481[b]
2021	22	27,812	6,090	14,308	0,000	100,000	-2,488[b]

Zakonska poreska stopa = 15% u ispitivanom periodu; b - Nivo statističke značajnosti 0,05

Izvor: Autor

rezultati se posmatraju preko medijane. U 2021. godini beleži se nagli rast efektivnih poreskih stopa usled čega su i vrednosti medijane porasle u odnosu na prethodne godine. Do rasta računovodstvene poreske stope dolazi usled većeg broja banaka sa priznatim odloženim poreskim prihodima, dok je rast tekuće poreske stope rezultat više plaćenog rashoda za porez u toj godini i vrednosti efektivne poreske stope modelirane na 100% zbog negativnog finansijskog rezultata zabeleženog kod dve banke. Rezultati Vilkokson-ovog testa potvrđuju hipotezu o statistički značajnoj razlici između zakonskih i efektivnih poreskih stopa, na nivou značajnosti od 0,05. Rezultati su u skladu sa nalazima S. Vržine (2018).

Testiranje multikolinearnosti

Pre implementacije modela potrebno je izvršiti test multikolinearnosti, izračunavajući linearni odnos između eksplanatornih varijabli u regresionom modelu. Odsustvo kolinearnosti među nezavisnim determinantama potvrđeno je izračunavanjem faktora inflacije varijanse (VIF). Rezultat testa je predstavljen u Tabeli 3. Uočava se da sve varijable imaju koeficijent VIF manji od 10, na osnovu čega se izvodi zaključak da nezavisne varijable u modelu nisu u visokoj korelaciji jedna sa drugom (O'brien, 2007). Srednja vrednost VIF od 2,06 je takođe ispod graničnog nivoa.

Tabela 3 Faktor inflacije varijanse

Nezavisne varijable	VIF	1/VIF
VEL	2,64	0,378085
LEV	2,00	0,500657
ROA	1,54	0,648205
KAP	4,22	0,237060
M&A	1,12	0,890274
PB-DB	1,45	0,691473
NB-IB	1,41	0,707383
Srednja vrednost VIF	2,06	

Izvor: Autor

Testiranje stacionarnosti

Budući da istraživanje koristi neuravnotežen panel podataka, za potvrdu stacionarnosti primenjen je Fišer-ov test jediničnog korena, koji kombinuje

p-vrednosti iz testova jediničnog korena koristići četiri metode predložene od strane I. Choi (2001). U Fišer-ovom testu, svi paneli sadrže jedinični koren i nestacionarni su (nulta hipoteza) ili je najmanje jedan panel stacionaran (alternativna hipoteza). U ovom radu, rezultati sva četiri testa za obe efektivne poreske stope odbacuju nultu hipotezu da paneli sadrže jedinični koren, što implicira da je najmanje jedan panel stacionaran, na nivou od 5% statističke značajnosti. To znači da u panelima nema jediničnih korena pod datim uslovima testa (uključujući srednju vrednost panela i vremenski trend) (Tabela 4).

Analiza determinanti efektivnih poreskih stopa

Primenom regresionih modela i odgovarajućih testova za izbor najrelevantnijeg modela i procenu ispunjenosti pretpostavki standardnog modela, dolazi se do zaključka da uticaj determinanti na efektivne poreske stope najbolje opisuje Model slučajnih efekata (Tabela 5). Prvi model ispituje uticaj determinanti na prvi skup podataka u ovom radu koji pokriva svih 113 opservacija. Kao što se može videti, na osnovu rezultata Hausman-ovog testa, u panelu sa računovodstvenom i sa tekućom efektivnom poreskom stopom, obe p-vrednosti su veće od 0,05 što ukazuje na to da je Model slučajnih efekata odgovarajući. Takođe, Breusch-Pagan-ov test, u panelu sa računovodstvenom efektivnom poreskom stopom gde je p-vrednost 0,0003 i panelu sa tekućom efektivnom poreskom stopom gde je p-vrednost 0,0000 sugeriše da treba primeniti Model slučajnih efekata.

U Tabeli 6 prikazani su rezultati koeficijenta regresije koji objašnjavaju uticaj poslovnih i institucionalnih determinanti banaka na efektivnu poresku stopu, sa statističkom značajnošću uticaja na tu promenu (p-vrednost). Dat je uporedni pregled koeficijenata dobijenih primenom Modela običnih najmanjih kvadrata, Modela fiksnih efekata i Modela slučajnih efekata.

Tabela 4 Fišer-ov test jediničnog korena

		EPS 1		EPS 2	
		Statistika	p-vrednost	Statistika	p-vrednost
Inverzni hi-kvadrat	P	175,2790	0,0000	70,6051	0,0113
Inverzna normala	Z	-5,8726	0,0000	-3,2140	0,0007
Inverzni logit t	L^*	-10,4753	0,0000	-4,3467	0,0000
Modifikovani inv. hi-kvadrat	Pm	13,4783	0,0000	2,5653	0,0052

Izvor: Autor

Tabela 5 Hausman-ov i Breusch-Pagan-ov test izbora modela

EPS 1	Rezultati	Zaključak
Hausman-ov test	chi2(4) = (b-B) ' [(V_b-V_B)^(-1)](b-B)=7,39 Prob>chi2 = 0,1165	Model slučajnih efekata
Breusch-Pagan-ov test	chibar2(01) = 11,91 Prob > chibar2 = 0,0003	Model slučajnih efekata
EPS 2		
Hausman-ov test	chi2(4) = (b-B) ' [(V_b-V_B)^(-1)](b-B) =1,07 Prob>chi2 = 0,8989	Model slučajnih efekata
Breusch-Pagan-ov test	chibar2(01) = 50,32 Prob > chibar2 = 0,0000	Model slučajnih efekata

Izvor: Autor

Tabela 6 Regresioni panel model sa originalnim setom podataka

	EPS 1			EPS 2		
	Model fiksnih efekata	Model slučajnih efekata	Model običnih najmanjih kvadrata	Model fiksnih efekata	Model slučajnih efekata	Model običnih najmanjih kvadrata
	Koef.	Koef.	Koef.	Koef.	Koef.	Koef.
VEL	14,30245 (p=0,365)	2,022367 (p=0,714)	-0,6950407 (p=0,856)	51,29576 (p=0,002**)	14,87268 (p=0,071*)	4,530438 (p=0,374)
LEV	0,000821 (p=0,999)	-0,8338045 (p=0,001***)	-0,7236761 (p=0,001***)	-0,4243554 (p=0,566)	-0,1005125 (p=0,765)	0,0710505 (p=0,798)
ROA	-1,204921 (p=0,176)	-0,9927682 (p=0,212)	-0,8518625 (p=0,274)	1,556539 (p=0,090*)	1,122536 (p=0,210)	-0,0339541 (p=0,974)
KAP	1,110631 (p=0,140)	-0,0048548 (p=0,984)	-0,0945882 (p=0,579)	1,133039 (p=0,143)	0,9405987 (p=0,009**)	0,531624 (p=0,013**)
M&A	0	-6,73183 (p=0,216)	-6,185444 (p=0,086)	0	-17,14328 (p=0,051*)	-14,03267 (p=0,004**)
PB-DB	0	-5,217761 (p=0,579)	-4,552595 (p=0,457)	0	5,716542 (p=0,709)	7,544946 (p=0,354)
NB-IB	0	-6,886395 (p=0,260)	-7,390821 (p=0,065)	0	-2,351658 (p=0,8103)	-3,862523 (p=0,465)
_cons	-123,6901	69,60898 (p=0,227)	83,03669 (p=0,039**)	-382,0249 (p=0,012**)	-117,6517 (p=0,169)	-44,55984 (p=0,401)
Napomena: *p<0,1; **p<0,05; ***p<0,001						
	R-kvadrat	0,2115		R- kvadrat	0,2048	
	Prilagođeni R- kvadrat	0,1589		Prilagođeni R- kvadrat	0,1518	
	Prob>chi²	0,0006		Prob>chi²	0,0009	
Broj opservacija: 113						

Izvor: Autor

Dobijeni rezultati prilagođenog R - kvadrata ukazuju na veoma nisku eksplanatornu moć modela, ispod nivoa 0,05, za obe efektivne poreske stope. Međutim, u okviru modela može se izdvojiti nekoliko determinanti sa statistički značajnim uticajem na efektivne poreske stope banaka.

Rezultati Modela slučajnih efekata su predstavljeni u nastavku. U modelu sa računovodstvenom efektivnom poreskom stopom, samo varijabla "leveridž" ima statistički značajan uticaj na računovodstvenu efektivnu poresku stopu na nivou od 1%, pri čemu povećanje leveridža za 1% smanjuje poresku stopu za 0,83%. Rezultati su u skladu sa istraživanjima C. P. Stickney i V. E. McGee (1982), X. Liu i S. Cao (2007), O. Inua (2018) i Ç. A. Hazir (2019). U panelu sa tekućom efektivnom poreskom stopom, uticaj leveridža nije statistički značajan. Model slučajnih efekata za tekuću poresku stopu pokazuje statistički značajan uticaj za determinante "veličina banke" (na nivou od 10%), "kapitalizacija" (na nivou od 5%), i "merdžeri i akvizicije" (na nivou od 10%). Od navedenih, najveću promenu posmatrane efektivne poreske stope izaziva promena determinante "merdžeri i akvizicije", tako što njen rast za 1% snižava stopu za 17,14%. Rezultat je u skladu sa nalazima T. Belz *et al* (2013). U periodu koji je obuhvaćen istraživanjem, efekat uticaja merdžera i akvizicija na tekuću efektivnu poresku stopu je potvrđen kod banaka koje su uspešno sprovele akviziciju prethodnih godina na teritoriji RS, poput Expobank, Addiko bank, Halkbank, Alta banke, u čijim je bilansima iznos rashoda tekućeg poreza na dobit nula. Odnosno, u posmatranom periodu, od ukupnog broja banaka koje su imale nulti tekući porez, više je onih koje su u ulozi kupaca sprovele proces akvizicije. Sledeća determinanta sa najvećim obimom promene je veličina banke, gde njen rast

Tabela 7 Hausman-ov i Breusch-Pagan-ov test izbora modela

EPS 1	Rezultati	Zaključak
Hausman-ov test	chi2(5) = (b-B) ' [(V_b-V_B)^(-1)](b-B) =3,06 Prob>chi2 = 0,6908	Model slučajnih efekata
Breusch-Pagan-ov test	chibar2(01) = 1,46 Prob > chibar2 = 0,1132	Model običnih najmanjih kvadrata
EPS 2		
Hausman-ov test	chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)=18,25 Prob>chi2 = 0,0026	Model fiksnih efekata

Izvor: Autor

za 1% povećava tekuću efektivnu poresku stopu za 14,87%, čime se potvrđuje hipoteza političkih troškova da su veće banke izložene većem poreskom opterećenju. Rezultati potvrđuju ranija istraživanja u ovoj oblasti koja su sproveli J. L. Zimmerman (1983), F. J. Delgado *et al* (2014), Y. M. Salaudeen i U. C. Eze (2018), Ç. A. Hazir (2019) i S. Vržina (2018) u oblasti bankarstva. U posmatranom periodu u RS, najveće banke su iskazale najveći iznos ukupnog i tekućeg rashoda za porez (Aik banka, Banca Intesa, Raiffeisen banka, UniCredit banka). Najmanju promenu poreske stope izaziva promena nivoa kapitalizacije banke. Sa rastom kapitalizacije, dolazi do rasta tekuće efektivne poreske stope za 0,94%, što je u skladu sa nalazima S. Lazăr i A. M. Andrieș (2022).

Profitabilnost kao determinanta se nije istakla ni po statistički značajnom uticaju ni po veličini promena u Modelu slučajnih efekata. Povećanje profitabilnosti banaka smanjuje računovodstvenu stopu za 0,99% (u skladu sa istraživanjem autora S. O. Rego (2003)) i povećava tekuću poresku stopu za 1,12%, što je potvrđeno u radovima T. C. Omer *et al* (1993), G. A. Plesko (2003) i E. Fernández-Rodríguez *et al* (2021).

Sumarno, hipoteze ovog rada su potvrđene za sledeće determinante: veličina banke, leveridž, merdžeri i akvizicije i učešće stranog kapitala. Hipoteze za determinante "profitabilnost" i "kapitalizacija" potvrđene su samo za tekuću poresku stopu, dok je za determinantu "proces privatizacije" hipoteza potvrđena samo za računovodstvenu efektivnu poresku stopu.

Rezultati nakon uključivanja determinante "rezervisanja za gubitke kredita" u model

Verifikacija rezultata je izvršena uključivanjem determinante "rezervisanja za kreditne gubitke", kreirajući time drugi model u ovom radu. Izvođenje Hausman-ovog i Breusch-Pagan-ovog testa na skupu podataka koji sadrži varijablu "rezervisanja za kreditne gubitke" pokazalo je da postoji promena u adekvatnosti modela koji treba primeniti u poređenju sa modelom testiranim na originalnim varijablama (Tabela 7). U panelu sa računovodstvenom efektivnom poreskom stopom, Breusch-Pagan-ov test pokazuje da je Model običnih najmanjih kvadrata prikladniji, s obzirom da je p-vrednost 0,11 veća od 0,05. U panelu sa tekućom efektivnom poreskom stopom, Hausman-ov test predlaže Model fiksnih efekata kao prikladniji. U slučajevima kada Hausman-ov test potvrdi postojanje statistički značajne razlike između koeficijenata modela, kao što je to u ovom slučaju u korist modela fiksnih efekata, tada model običnih najmanjih kvadrata nije pogodan za primenu (Dougherty, 2011). Posledično, nije bilo potrebe za sprovođenjem Breusch-Pagan-ovog testa u panelu sa tekućom poreskom stopom.

Prisustvo rezervisanja za gubitak kredita u Modelu običnih najmanjih kvadrata u potpunosti ističe statistički značajan uticaj determinanti "leveridž", "profitabilnost" i "učešće stranog kapitala" na efektivne poreske stope. Takođe, rezervisanja imaju statistički značajan uticaj na računovodstvenu efektivnu poresku stopu.

Tabela 8 Regresioni panel model sa varijablom "rezervisanja za gubitke po kreditima"

	EPS 1			EPS 2		
	Model fiksnih efekata	Model slučajnih efekata	Model običnih najmanjih kvadrata	Model fiksnih efekata	Model slučajnih efekata	Model običnih najmanjih kvadrata
	Koef.	Koef.	Koef.	Koef.	Koef.	Koef.
VEL	13,77834 (p=0,391)	-1,301389 (p=0,774)	-2,042849 (p=0,556)	52,843980 (p=0,002)**	8,938954 (p=0,223)	2,731426 (p=0,553)
LEV	-0,109641 (p=0,901)	-0,8918349 (p=0,000***)	-0,9042379 (p=0,000***)	-0,0979 (p=0,914)	-0,1436747 (p=0,639)	-0,1699577 (p=0,506)
ROA	-1,263366 (p=0,176)	-1,913859 (p=0,015)	-2,201034 (p=0,004**)	1,729186 (p=0,072)*	0,3916962 (p=0,678)	-1,834785 (p=0,069)*
KAP	0,9953968 (p=0,280)	-0,0081891 (p=0,967)	-0,050984 (p=0,741)	1,473441 (p=0,120)	0,8505882 (p=0,007)**	0,631364 (p=0,003)**
REZ	-0,0292502 (p=0,827)	-0,1766153 (p=0,000***)	-0,1854563 (p=0,000***)	0,0864051 (p=0,530)	-0,1471396 (p=0,034)**	-0,2475412 (p=0,000)***
M&A	0	-8,259009 (p=0,058*)	-8,069201 (p=0,015**)	0	-17,62322 (p=0,017)**	-16,54705 (p=0,000)***
PB-DB	0	-8,567659 (p=0,254)	-8,545317 (p=0,128)	0	3,095058 (p=0,810)	2,215587 (p=0,765)
NB-IB	0	-9,856129 (p=0,044**)	-10,02533 (p=0,007**)	0	-5,512307 (p=0,510)	-7,378976 (p=0,128)
_cons	-108,0079 (p=0,509)	107,8986 (p=0,023**)	115,8275 (p=0,002**)	-428,3501 (p=0,012)	-59,79695 (p=0,434)	-0,7917615 (p=0,987)

Napomena: *p<0,1; **p<0,05; ***p<0,001

R-kvadrat	0,3619	R- kvadrat	0,3575
Prilagođeni R- kvadrat	0,3128	Prilagođeni R- kvadrat	0,3081
Prob>chi²	0,0000	Prob>chi²	0,0000

Broj opservacija: 113

Izvor: Autor

U Tabeli 8 su rezultati ispitivanja. U Modelu običnih najmanjih kvadrata, panel sa računovodstvenom efektivnom poreskom stopom, rast svake od determinanti za 1% dovodi do smanjenja efektivne poreske stope, iz čega proizilazi da politika upravljanja kreditnim rizikom zahvata svaki segment poslovanja banaka utičući na sve varijable ovog modela, što se indirektno odražava na efektivnu poresku stopu. Uprkos tome što "leveridž" i "rezervisanja" imaju najznačajniji uticaj (p=0,0000), pad efektivne poreske stope pod njihovim uticajem je veoma mali (-0,90 i -0,18, respektivno). Rad potvrđuje hipotezu koju su postavili S. Lazăr i A. M. Andrieș (2022). U Modelu fiksnih efekata, „veličina" i „profitabilnost" su statistički najznačajnije varijable. Povećanje aktive banke za 1% dovodi do povećanja tekućeg poreza za više od 50%. Posmatrajući originalni skup podataka i skup sa uključenom varijablom „rezervisanja", Model fiksnih efekata pokazuje da promena veličine banaka dovodi do najvećih pomeranja efektivne poreske stope, kroz rast koji ide i do više od 50%. „Profitabilnost" ima statistički značajan uticaj u oba panela.

U ispitivanom modelu, hipoteze ovog rada su potvrđene za determinante sa 1%, 5% i 10% nivoa značajnosti: veličina banke (EPS 2), leveridž (EPS 1), profitabilnost (EPS 1 i EPS 2), rezervisanja (EPS 1) i meržeri i akvizicije (EPS 1).

Rezultati nakon izuzimanja banaka sa gubitkom pre oporezivanja iz modela

Druga verifikacija rezultata je izvršena tako što su iz modela isključene banke sa gubitkom pre oporezivanja (bez determinante "rezervisanja za kreditne gubitke"), kreirajući na taj način treći model ovog rada. Negativan finansijski rezultat je prisutan u 19 opservacija, odnosno šest banaka je poslovalo sa gubitkom pre oporezivanja u posmatranom periodu (API banka, Mirabank, Mobi banka, Bank Of China, Expobank i OTP banka), pri čemu su Mirabank i Mobi banka konstantno poslovale sa gubitkom. Rezultati u Tabeli 9 pokazuju da je Model fiksnih efekata prikladniji za panel sa računovodstvenom stopom a Model slučajnih efekata za panel sa tekućom stopom. U slučajevima kada Hausman-ov test potvrdi postojanje statistički značajne razlike između koeficijenata modela, kao što je to u ovom slučaju u korist modela fiksnih efekata, tada model običnih najmanjih kvadrata nije pogodan za primenu (Dougherty, 2011). Posledično, nije bilo potrebe za sprovođenjem Breusch-Pagan-ovog testa u panelu sa tekućom poreskom stopom.

Isključivanjem banaka sa negativnim finansijskim rezultatom pre oporezivanja iz uzorka, determinanta "kapitalizacija" dobija na značaju. Banke sa ostvarenim dobitkom pre oporezivanja mogu da upravljaju efektivnim poreskim stopama i poreskim opterećenjem regulisanjem nivoa kapitalizacije. Ovo je dodatno podržano Bazelskim kapitalnim zahtevima. Ako se učešće osnovnog kapitala poveća za 1%, samo za banke koje posluju sa dobitkom, to će dovesti do smanjenja računovodstvene efektivne poreske stope za 0,32% i manjeg povećanja tekuće efektivne poreske stope za 0,12%. S. Lazăr i A. M. Andrieș (2022) došli su do istih nalaza. Značajan uticaj determinante "veličina banke" dominira u panelu sa tekućom poreskom stopom, kao i u svim dosadašnjim proračunima koji su vršeni za EPS 2. Za banke sa dobitkom pre oporezivanja u posmatranom vremenskom periodu, povećanje aktive banaka za 1% dovodi do povećanja tekuće efektivne poreske stope za 11,46%.

U ispitivanom modelu hipoteze ovog rada su potvrđene sa 1% nivoa značajnosti za determinante "veličina banke" (EPS 2) i "kapitalizacija" (EPS 2).

ZAKLJUČAK

Istraživanje u ovom radu obuhvata bankarski sektor Republike Srbije, sve banke koje su poslovale na dan 31. decembra 2021. godine, čineći uzorak od 113 opservacija za period od pet godina, od 2017. do 2021. godine. Empirijsko istraživanje obuhvata dve vrste efektivnih poreskih stopa, računovodstvene i tekuće, ispitujući kako na njih utiču poslovne i institucionalne determinante.

Rezultati istraživanja pokazuju da su u posmatranom periodu prosečna računovodstvena i tekuća efektivna poreska stopa u kontinuitetu ispod zakonske poreske stope, na osnovu čega se može zaključiti da je realno poresko opterećenje banaka u RS znatno manje od zakonskog opterećenja. U RS je zakonska stopa

Tabela 9 Hausman-ov i Breusch-Pagan-ov test izbora modela

EPS 1	Rezultati	Zaključak
Hausman-ov test	chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)= 2,89 Prob>chi2 = 0,5759	Model slučajnih efekata
Breusch-Pagan-ov test	chibar2(01) = 3,56 Prob > chibar2 = 0,0295	Model slučajnih efekata
EPS 2		
Hausman-ov test	chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)=33,39 Prob>chi2 = 0,0000	Model fiksnih efekata

Izvor: Autor

Tabela 10 Regresioni panel model bez banaka sa gubitkom pre oporezivanja

	EPS 1			EPS 2		
	Model fiksnih efekata	Model slučajnih efekata	Model običnih najmanjih kvadrata	Model fiksnih efekata	Model slučajnih efekata	Model običnih najmanjih kvadrata
	Koef.	Koef.	Koef.	Koef.	Koef.	Koef.
VEL	5,75480 (p=0,596)	-4,281385 (p=0,107)	-4,874507 (p=0,012)**	11,45949 (p=0,072)*	-1,232369 (p=0,584)	-3,217497 (p=0,024)**
LEV	-0,2643343 (p=0,643)	-0,2771783 (p=0,157)	-0,4158164 (p=0,012)**	-0,2616895 (p=0,429)	-0,1835364 (p=0,195)	-0,1450662 (p=0,232)
ROA	0,511036 (p=0,800)	0,2847851 (p=0,593)	0,570115 (p=0,284)	-0,020731 (p=0,952)	0,2283673 (p=0,501)	1,08525 (p=0,007)**
KAP	-0,2016628 (p=0,797)	-0,3279384 (p=0,038)**	-0,3974515 (p=0,002)**	0,122159 (p=0,788)*	0,2288229 (p=0,078)*	-0,3554083 (p=0,000)***
M&A	0	-2,511004 (p=0,354)	-2,031509 (p=0,281)	0	-4,903898 (p=0,038)*	-3,848523 (p=0,007)**
PB-DB	0	-2,653191 (p=0,544)	-3,950368 (p=0,194)	0	3,895744 (p=0,309)	3,209968 (p=0,155)
NB-IB	0	-4,771381 (p=0,109)	-5,642143 (p=0,008)**	0	-4,589048 (p=0,075)*	-4,783514 (p=0,003)**
_cons	-14,7970 (p=0,895)	72,90445 (p=0,016)**	90,70104 (p=0,000)***	-66,64242 (p=0,306)	32,31067 (p=0,184)	45,67595 (p=0,009)**

Napomena: *p<0,1; **p<0,05; ***p<0,001

R-kvadrat	0,2127	R- kvadrat	0,4218
Prilagođeni R- kvadrat	0,1486	Prilagođeni R- kvadrat	0,3747
Prob>chi²	0,0036	Prob>chi²	0,0000

Broj opservacija: 94

Izvor: Autor

poreza na dobitak tokom posmatranog perioda bila 15%, dok je prosečna računovodstvena stopa za ceo period bila na nivou 8,83% a tekuća 9,82%. Moguće je da bi eliminisanjem modeliranih vrednosti efektivne poreske stope od 100%, prosečna tekuća poreska stopa bila na još nižem nivou, s obzirom da je 10 banaka u bilansima za 2021. godinu prijavilo tekući porez na nivou od 0%, odnosno da nemaju trošak rashoda po osnovu tekućeg poreza. Na osnovu navedenog može se zaključiti, a ujedno potvrditi ranija istraživanja, da zakon u RS pruža bankama značajne poreske podsticaje, prvenstveno motivisane investicijama i razvojem privrede i društva. Konkurencija među bankama na tržištu RS dovodi do merdžera i akvizicija, koje dodatno imaju pozitivan efekat na snižavanje efektivnih poreskih stopa, što je potvrđeno u nalazima ovog rada u delu koji se bavi uticajem determinanti na efektivne poreske stope. Rezultati istraživanja na originalnom uzorku pokazuju da promene u merdžerima i akvizicijama, odnosno njihov rast za 1%, u poređenju sa ostalim poslovnim i institucionalnim determinantama, smanjuje tekuću obavezu za porez za 17,14% a rast veličine banaka za 1% povećava tekuću efektivnu poresku stopu za 14,87%. Iz navedenog se može zaključiti da ukrupnjavanje aktive i kapitala banke kupca, kao posledica merdžera i akvizicija, smanjuje tekuću efektivnu poresku stopu samo do određenog nivoa (do određene veličine banke), odnosno da sa rastom banaka u nekom trenutku i tekuće efektivne poreske stope počinju da

rastu. Potencijalni otpisi potraživanja po kreditima su ključni segment u poslovanju banaka i činjenica je da će im se sve više poklanjati pažnja kako sa teorijskog aspekta, tako i kroz praktično poslovanje banaka, u pogledu upravljanja kreditnim rizicima. U modelu koji uključuje rezervisanja za otpise potraživanja, rast svake od determinanti za 1% dovodi do smanjenja računovodstvene efektivne poreske stope u određenoj meri, pri čemu povećanje aktive banke za 1% dovodi do povećanja tekućeg poreza za više od 50%. Profitabilnost, leveridž i rezervisanja u tom modelu imaju statistički značajan uticaj na poresko opterećenje iako se poreske stope menjaju u manjem obimu. Rezultati istraživanja za model koji isključuje banke sa gubitkom pre oporezivanja, pokazuju da banke mogu da upravljaju efektivnim poreskim stopama i poreskim opterećenjem regulisanjem nivoa kapitalizacije i veličine. Ostale determinante modela nisu značajne niti dovode do većih pomeranja poreskih stopa.

Na osnovu prikazanih rezultata, zaključuje se da banke uživaju niske poreske stope zbog svoje poslovne politike i politike države u kojoj posluju. Kreatori monetarne politike sa posebnom pažnjom upravljaju zakonskom poreskom stopom, i uprkos potencijalu za povećanje efektivnih poreskih stopa, svesni su rizika koji bi bili izazvani, kao što je sposobnost banaka da prebace poresko opterećenje na svoje klijente kroz povećanje cena bankarskih proizvoda i usluga. Upravljanje poreskom politikom u modernom svetu podrazumeva da banke vode računa o svakom segmentu poslovanja i svakom faktoru uticaja koji, kao što je prikazano, može da izazove promene efektivne poreske stope u određenom obimu. Neke determinante su podložne jednostavnijem upravljanju, neke nisu. Realno poresko opterećenje banaka u RS, iskazano preko tekuće efektivne poreske stope, je u svim modelima ovog rada pod najvećim uticajem promene u merdžerima i akvizicijama i veličini banke, a to su procesi koji se aktivno odvijaju na bankarskom tržištu RS u poslednjih nekoliko godina.

Gore navedeni zaključci podležu određenim ograničenjima. Kao potencijalni nedostatak može se istaći da je ovaj rad obuhvatio samo jednu grupu determinanti koje utiču na stvarno poresko opterećenje banaka. Takođe, u cilju neutralisanja negativnih vrednosti u analizi, modelirane su poreske stope koje mogu da iskrive rezultate istraživanja. Ovo je delimično rešeno primenom modela sa izostavljenim opservacijama sa gubitkom pre oporezivanja. Predlozi za buduća istraživanja mogu uključivati nekoliko, kao što su produženje vremenskog okvira koji se koristi u analizi, primena drugih vrsta efektivnih poreskih stopa, kao i uključivanje banaka iz zemalja regiona. Analiza determinanti efektivne poreske stope može biti osnova za kasniju analizu o tome kako ovi efekti dovode do prelivanja poreskog opterećenja na korisnike.

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Primljeno 13. decembra 2022,
nakon revizije,
prihvaćeno za publikovanje 21. aprila 2023.
Elektronska verzija objavljena 27. aprila 2023.

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BUSINESS AND INSTITUTIONAL DETERMINANTS OF EFFECTIVE TAX RATES IN SERBIAN BANKS

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The objective of the current paper is to study the influence of the selected business and institutional determinants on the annual effective tax rates in banks in the Republic of Serbia (RS). Panel data regression models are applied on 113 observations, covering the period from 2017 to 2021, where the accounting and current effective tax rates are used as a measure of the actual tax burden. The results show that the effective tax rate in banks in RS is significantly below the statutory level. Furthermore, for each data set, the coefficients of changes in the effective tax rate are calculated, and the most adequate model is selected using the Hausman and Breusch-Pagan tests. In the first model, the biggest change in the effective tax rates is caused by change in leverage, merger and aquisition processes and the bank size. The presence of loan loss provisions in the model completely highlights the impact of profitability and leverage. Finally, in the last model, banks with a profit before tax can manage effective tax rates and tax burdens by regulating capitalization levels. The results of this study are of interest for economy creators and for business managers in banks, helping them in effective tax planning and managing the results.

Keywords: tax burden, effective tax rate, leverage, loan loss provisions, capitalization, profitability

JEL Classification: G21, H21

PRILOG

Spisak banaka u uzorku, sa nazivima koji su važili tokom posmatranog perioda i sadašnji nazivi banaka (nakon akvizicija). U tekstu rada, autor je koristio sadašnje nazive banaka.

R.b.	Poslovno ime banke	R.b.	Poslovno ime banke
1	Hypo-Alpe-Adria Bank (sadašnji naziv: Addiko banka)	13	NLB Banka (sadašnji naziv: Nlb Komercijalna banka)
2	Agroindustrijsko komercijalna banka Aik banka	14	Mirabank
3	Jubmes banka a.d. Beograd (sadašnji naziv: Alta banka)	15	Telenor banka (sadašnji naziv: Mobi banka)
4	VTB Banka (sadašnji naziv: API banka)	16	Sber banka (sadašnji naziv: Aik banka)**
5	Banca Intesa	17	Opportunity banka (sadašnji naziv: 3 Banka)
6	Poštanska Štedionica	18	Vojvođanska banka, Societe Generale banka (sadašnji naziv: OTP banka)
7	Bank Of China	19	Procredit banka
8	Credit Agricole banka (sadašnji naziv: RBA banka)*	20	Raiffeisen banka
9	Marfin banka (sadašnji naziv: Expobank)	21	Srpska banka
10	Erste banka	22	UniCredit banka
11	Eurobank (sadašnji naziv: Eurobank Direktna)	23	Komercijalna banka***
12	Halkbank	-	-

*****U 2022. godini započeo je process akvizicije Raiffeisen banke nad Credit Agricole bankom.
****** U 2022. godini je završen process akvizicije AIK banke nad Sber bankom.
******* U 2022. godini je završen process akvizicije NLB banke nad Komercijalnom bankom.

Izvor: Autor, na osnovu podataka Narodne banke Srbije

Ekonomski horizonti, Januar - April 2023, Volumen 25, Sveska 1, 55 - 69
UDC: 33 ISSN: 1450-863 X

www. ekfak.kg.ac.rs

Review paper
UDC: 331.56-053.6(64)
doi:10.5937/ekonhor2301055F

EXPLORING YOUTH UNEMPLOYMENT IN MOROCCO: EVIDENCE FROM MICRO-LEVEL DATA

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This paper explores youth unemployment in Morocco using the Labor Force Survey of the 2019 data to estimate a logit model. The paper provides the evidence for the three categories of possible determinants of youth unemployment in Morocco. The first set of determinants are the geographic and sociodemographic characteristics such the sex, age, the marital status and the area of residence. Secondly, the socioeconomic factors such as the young people's family background and the number of workers per household play a decisive role in explaining youth unemployment in Morocco. Thirdly and finally, the results obtained in this study show that (regardless of their diplomas) young graduates are more likely to be unemployed than persons without a diploma. However, the influence a diploma type has on the probability of being unemployed varies according to the diploma type. The results obtained shed a light on the important characteristics of youth unemployment in Morocco and should serve as a guide for future research in more specific knowledge gaps.

Keywords: labor market, youth unemployment, graduate unemployment, qualified labor, logit model

JEL Classification: J21, J24, J64, J71

INTRODUCTION

Unemployment in Morocco is a special phenomenon. It disproportionately affects the most important part of the workforce - the youngest, the most qualified, and the most expensive to train and replace. According to the High Commission for Planning (HCP), the unemployment rate in Morocco reached 11.4% in 2022. Furthermore, while the overall unemployment rate is high, the decomposition of unemployment by the age group paints a grimmer picture. In fact, the unemployment rate reached 18.4% for the individuals aged 25 to 34, and 31.7% for those between 15 and 24 years of age. Other discrepancies can be observed between the unemployment of males (9.5%) and females (17.8%), rural unemployment (5.2%) and urban unemployment (15%), and unemployment between graduates (17.7%) and nongraduates (4.1%). These differences could result from multiple factors such as the sex or age-based discrimination, a

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mismatch between graduates' skills and employers' needs, or discrepancies between job opportunities in rural/urban areas. These observed trends could reflect the impact of individual characteristics on unemployment. Because of the ecological fallacy, however, any inference about the causal relationship between these characteristics and the probability of being unemployed should use an appropriate research design.

While youth entrepreneurship can be a solution to youth unemployment, an inadequate business environment, financial constraints, and excessive taxation yet remain barriers to self-employment by the young in developing countries (Bogetić, Đorđević & Ćoćkalo, 2011). Designing policies to reduce youth unemployment is necessary to limit its adverse effects on developing countries' human resource allocation (Njifen, 2015). Doing so requires a deeper understanding of the individual characteristics related to youth unemployment (Tasci & Tansel, 2005).

Much of the previous analysis of youth employment in Morocco used aggregate data. While this may yield valuable insights, it neglects much of the individual characteristics of the young and unemployed. Thus, this paper aims to examine the individual characteristics of young workers and their impact on the probability of being employed. While the analysis carried out in this paper is exploratory, the objective is to shed light on the vulnerabilities of young Moroccan workers to guide future research in more specific knowledge gaps.

Light is particularly shed on the significance of Moroccan young workers' geographic, sociodemographic and socioeconomic, and educational characteristics and how they influence the probability of being employed. A binary logistic model is used in the paper to analyze the micro-level data sourced from the Labor Force Survey of 2019.

The rest of the paper is divided into four sections. The first section discusses the theoretical and empirical literature. The second section describes the data and the empirical methodology. In the third section, the research results are presented, whereas in the final section, conclusions are drawn together with the implications of the research results.

LITERATURE REVIEW

The determinants of unemployment are a highly discussed issue in the literature. However, youth unemployment is a special dimension of the issue that requires a special lens of analysis. The reviewed studies on the psychological impact of youth unemployment by A. Furnham (1985) point out the fact that unemployment causes stress, self-esteem deterioration, and change in young people's expectations for their access to the labor market. Also, the determinants of youth unemployment are multidimensional and include demographic factors, changes in the economic environment, including the labor market, as well as the factors related to education, work experience, and training (Furnham, 1985).

In this section, some theoretical and empirical literature on the determinants of youth unemployment is discussed from the microeconomic perspective of rational economic agents in accordance with the scope of the empirical analysis made.

Youth unemployment: A theoretical overview

A prominent explanation of youth unemployment hinges on the rational choices of workers. Under perfect market conditions, many labor market models consider unemployment as a voluntary decision made by rational individuals refusing to work by determining the optimal combination between work and leisure (Chadi, 2010). In an extension of the seminal critique of perfect rationality in G. J. Stigler (1961), the application of search theory to the labor market indicates the existence of the informational asymmetries that increase the cost of job search and, consequently, reservation wages (Stigler, 1962). Reservation wages are directly affected by a worker's level of education and qualification, i.e. the more skilled the worker, the higher his/her reservation wage. In this context, youth unemployment can be explained by economic agents' rational voluntary choices. In other words, the decision to participate in the labor market is a result of the trade-off

between continuing job seeking and the available job opportunities in the market. Individuals can either accept or refuse the market's real equilibrium wage based on the opportunity cost of each option. Consequently, higher reservation wages make young, educated individuals more inclined to decide to stay unemployed.

Following the same analytical framework, J. R. Harris and M. P. Todaro (1970) divide the labor market into two sectors: the formal sector, offering high wages with very limited job opportunities, and the informal sector, offering unlimited job opportunities with lower wages. Within this framework, the unemployed choose to voluntarily stay unemployed, seeking the opportunity to improve their economic situation rather than taking available low-paying jobs in the informal sector. According to B. Boudarbat (2006), the same logic could be applied to the duality between the public and the private sectors. Accordingly, because of higher reservation wages or discrepancies between jobs in the formal/informal and public/private sectors, young people may voluntarily prefer unemployment to inadequate employment.

While the first group of theoretical explanations focus on young workers' internal decision-making process, another set of theoretical works put a greater emphasis on the external factors explaining youth unemployment. According to these studies, the existence of spatial and skill disparities may play an important role in wage setting and unemployment. For instance, D. Houston (2005) argues that the presence of skills and spatial mismatches often explains imbalances in the distribution of jobs between regions, which would subsequently be the origin of unemployment. J. R. Harris and M. P. Todaro (1970) explain the high urban unemployment rate in developing countries by a large wage gap between jobs in urban versus rural areas, which encourages the migration towards urban areas or international markets. Faced with this situation, young individuals can either make a voluntary decision to remain unemployed, accept overeducation in the local market, or move towards regions with better opportunities for skilled labor. However, various constraints associated with the third option, such as the high monetary costs of job search and moving out and the inflexibility of the situation of young married women, force young skilled workers either to remain unemployed or to accept overeducation and the underutilization of their skills in local markets (Njifen, 2015). According to these explanations, youth unemployment can be explained by the disproportionate effect of mobility costs on workers at the start of their careers.

The relevance of human capital theory to the labor market analysis has attracted researchers' attention in recent decades (Petrović, 2010). Hence, a lack of investment in human capital remains one of the most discussed determinants of youth employment. According to the proponents of human capital theory (Becker, 1962; Mincer, 1975), discrepancies between education and employers' needs are the important determinants of youth unemployment. For instance, J. Mincer (1975) examined the effects of education on the income derived from employment. According to Mincer, education is considered as an investment in an inventory of "skills" or a formation of "human capital". The acquisition of a stock of knowledge and skills through formal education allows the improvement of workers' productivity that is likely to be put to use in employment. Therefore, pursuing formal education makes workers more productive and more efficient in the labor market. G. S. Becker (1962) argues that a lack of investment in one component or in more components of human capital may reduce youth employability and lead to unemployment. Becker distinguishes between the three components of human capital: general theoretical knowledge industry/company-specific training and the state of health required to mobilize both. However, these components, especially the first two, are not substitutable and failures in the acquisition and maintenance of one component or more components are the origin of unemployment.

In the same vein, L. Mauro and G. Carmeci (2003) argue that young graduates' lack of professional experience is the main determinant of youth unemployment. Young graduates must acquire firm and industry-specific knowledge through on-the-job activities so that educated human capital can become productive, which reduces the productivity of the

untrained. Thus, hiring the practices that place more emphasis on professional experience contributes to the unemployment of educated youth. A vicious cycle is thus created in the segments of employment where having on-the-job training requires employment for young workers looking for their first job (Njifen, 2015). Therefore, according to human capital theory, youth unemployment arises because of the underinvestment of young workers in one component or in more components of human capital.

In conclusion, it is unlikely that youth unemployment is the result of one single factor. Several theoretical explanations can simultaneously be correct. Ultimately, unemployment is a dynamic, complex, and multidimensional economic phenomenon. An empirical examination of the characteristics of youth unemployment is then necessary to draw relevant conclusions.

A review of the empirical literature

A significant body of empirical literature has examined the determinant of youth unemployment from a microeconomic perspective. These studies have confirmed the role played by age, the sex, geography, and education in determining labor market outcomes. The review the empirical literature presented herein starts by examining some examples of international studies before focusing the attention on the Moroccan case.

H. M. Tasci and A. Tansel (2005) analyzed the determinants of the transition of Turkish workers between different states of the labor market. The first phase of the study consists of the calculation of the probabilities of transition between the labor market states. The second phase consists of the estimation of multinomial logistic models in order to investigate the determinants of the transition of men and women between different states of the labor market. The results show that women in urban areas are more likely to be unemployed. Furthermore, single individuals are more likely to be unemployed. Finally, the probability of losing the job decreases for older and more educated individuals.

G. B. N. Njikam, R. Marc and L. Tchoffo (2005) also analyze the characteristics of youth unemployment in Cameroon using two econometric models. The first analyzes the gains of the labor market participation for young people. The second is based on the multinomial logistic model of labor market participation that distinguishes between young people and adults. The authors conclude that having a higher degree does not boost one's chances of finding a job. Young graduates have high reservation wages. Therefore, they try to make their degree worthwhile by seeking secured jobs. The results also confirm the fact that young women are faced with discrimination in terms of the salary and the responsibilities entrusted to them. Later, I. Njifen (2015) use the decomposition techniques of Blinder and Oaxaca to analyze the characteristics of youth unemployment in Cameroon and the gap in this unemployment according to the gender and a diploma. The findings reveal the presence of gender discrimination in hiring, as well as the explanatory role of education and the area of residence in the worsening of youth unemployment.

The youth unemployment issue has always attracted the attention of researchers in Morocco. In particular, M. Bougroum, A. Ibourk and A. Trachen (2002), N. El Aoufi and M. Bensaïd (2005), B. Boudarbat (2006), J. Ait Soudane, S. Sohli and M. Chiadmi (2020), F. Berahou and A. Abdouni (2021), Y. Idhadj and K. Louizi (2021) analyzed the Moroccan labor market so as to study the determinants of the unemployment of a significant part of the labor force in Morocco from a microeconomic perspective. For example, B. Boudarbat (2006) analyzed the evolution of employment and the wage situation in Morocco using the micro-data from the Labor Force Survey of 1998 in order to show that young graduates prefer stable and well-paid work and, therefore, "voluntarily" risk long periods of unemployment. The results show that while job opportunities and wages have improved for unskilled workers, there is still a significant and gradual decrease in returns to education. Furthermore, N. El Aoufi and M. Bensaïd (2005) examined the unemployment of young graduates based on the population census data of 2004. The authors addressed the different components of the labor market, learning outcomes, the education

and training system, and its relevance to the labor market requirements. They suggested that the prevalence of youth unemployment was linked to a multitude of factors, namely, demographic factors, the imbalance between labor supply and demand, the effects of economic policies, and the orientations of the development model adopted in Morocco after independence. Furthermore, J. Schonholzer (2008) explored the factors that affect access to employment among young vocational training graduates in Morocco. Using a simple logistic model, the author concluded that the gender, certain traits of the father, some types of diplomas, specific sectors of the economic activity, and graduation from public institutions significantly improve the probability of accessing a job. Finally, M. Bougroum *et al* (2002) used a multinomial logistic model to analyze the role of certain key characteristics (diploma characteristics, age, the gender, income, the household size and the situation of a young person inside the household) in the determination of young graduates' access paths to the labor market. The authors emphasize the fact that there is no theoretical framework that holistically encapsulates the phenomenon of graduate unemployment which public decision-makers could base their policies on.

More recently, J. Ait Soudane *et al* (2020) analyzed the role of soft skills and both human and social capital in explaining the difficulties encountered by young graduates in gaining access to employment in Morocco. Using a probit model, the authors showed that the study level and field play a determining role in explaining young graduates' employment. The results also show that relational skills are the selection filters most used by employers. In addition, F. Berahou and A. Abdouni (2021) shed light on the career paths of 1621 university graduates of the class 2009 over the first three years after graduation using the optimal matching classification algorithm to determine the different career paths of the individuals and revealed the existence of six distinct career paths. The authors then estimated a multinomial logit model to analyze the impact of the different factors influencing the probability of belonging to a typical career path. The results confirm the existence of the gender discrimination and the influence of the family characteristics such as the level of parental education. Finally, they show that the impact of the diploma type on access to employment. In particular, the results show that holders of bachelor's degrees are the segment of the sample which is the most vulnerable to unemployment. Also, Y. Idhadj and K. Louizi (2021) explored the time needed to escape unemployment and the factors likely to lengthen it, based on the data collected from 468 graduates sourced from a retrospective study of the young people who had benefited from the integration contracts between 2015 and 2019. The results of the estimates from the Kaplan-Meier survival model show that the higher the education level, the greater the risk of lengthening the duration of unemployment. Finally, they show that a significant part of the variance in the duration of the graduates' unemployment is essentially due to their job search methods.

DATA AND METHODOLOGY

To do empirical research, the literature review was used to formulate the following hypotheses about the determinants of youth unemployment in Morocco:

H1: Women are more likely to be unemployed than men.

H2: In older individuals, there is a lower probability of being unemployed.

H3: Living in an urban area increases the probability of being unemployed.

H4: Being married decreases the probability of being unemployed.

H5: A higher level of education increases the probability of being unemployed.

H6: A higher level of parental education reduces the probability of being unemployed.

H7: Individuals living with a greater number of employed workers in their household are less likely to be unemployed.

To test these hypotheses, a binary logistic regression model is used to predict the probability of being unemployed for a young person.

Econometric methodology

A binary logistic regression model (also known as a binary logit model) is a predictive model that can be used to predict the probability of a certain binary outcome (Wilson & Lorenz, 2015). For an overview of the logit model, see D. W. Hosmer and S. Lemeshow (1991).

The general equation of a logit model can be expressed as follows:

$$Y = \log\left(\frac{p_1}{1-p_1}\right) = \beta_0 + \beta_1 X_1 + \ldots + \beta_k X_k \quad (1)$$

where p_1 is the probability of the occurrence of the event Y outcome given a set of explanatory variables X_1 to X_k and their estimated coefficients β_i (i = 0 to k). The estimation of the coefficients of the explanatory variables is based on their ability to predict the event so that the predictions of the outcome Y are as close as possible to the observed values. The probability p_1 of the occurrence of an event (Y = 1) varies according to the values of the explanatory variables according to the following logistic function:

$$P(Y=1 \mid X) = \frac{e^{(\beta_0+\beta_1 X_1+\ldots+\beta_k X_k+\varepsilon}}{1+e^{(\beta_0+\beta_1 X_1+\ldots+\beta_k X_k+\varepsilon}} \quad (2)$$

The logistic model predicts a probability ranging between 0 and 1 for each individual. If this probability is close to 1, the occurrence of the event to be predicted (namely, being unemployed, for the purpose of this study) is more probable, and if this probability is close to 0, the occurrence of the event is unlikely. Logistic regression aims to find a specification (a group of explanatory variables) that improves the predictivity of the model compared to the initial basic model (the model without explanatory variables, often called "step 0").

How well the logit model fits in is determined by the four main statistics: the -2log likelihood statistic (-2LL) that illustrates the difference between the base model (step 0) and the estimated model (with the explanatory variables), the pseudo-R-squared statistics (Cox & Snell, 1989; Nagelkerke, 1991), representing the estimate of the variance explained by the model, and the Pseudo-R2 (McFadden, 1974) used as the estimate of the explained variability of the model.

$$R^2_{\text{McFadden}} = \frac{-2LL_{base} - (-2LL_{model})}{-2LL_{base}} \quad (3)$$

The fitted model is then interpreted using odds ratios. An odds ratio is the odds of the occurrence of the outcome event $Y = 1$ after one unit change in the predictor divided by the original odds that the event happens. To obtain the odds ratio (OR) in the case of a categorical variable, the reference category must be defined, and ORs will then be defined in opposition to this reference situation. The choice of a reference modality is important for interpretation as it cannot be dissociated from the qualitative analysis of the results. If the variable X has n modalities, (n-1) odds ratios will be calculated as follows:

$$Odds - ratio(ni) = \frac{Odds_{mi}}{Odds_{mr}} \quad (4)$$

with m_i being the modality i of the variable and m_r being its reference modality.

Data

This study is based on a representative sample sourced from the National Employment Survey (NES) of 2019. NES is an annual survey conducted by the HCP and aims to provide information about the situation and evolution of the labor force in Morocco. Access to the survey's database is very restricted and limited to a controlled environment due to data confidentiality and other privacy concerns. The dataset made available to the authors[1] in its raw state contains 15 variables and more than 142,000 individuals. However, to obtain relevant data for the research question, the dataset was further processed using two filters. First, in order to limit the data to young people, only the individuals between 15 and

29 years of age were selected. Second, the individuals not seeking employment were excluded as we were mainly interested in the determinants of youth unemployment, not in their access to the labor market. The final dataset consists of 25,589 individuals, which represents 18% of the initial dataset.

Model specification

The outcome variable is the labor market states of young people, which is the binary variable that takes 0 if the individual is unemployed, and 1 if the individual is employed. The choice of the explanatory variables is based on intuition and the review of the empirical literature. All the variables and their modalities are summarized in Table 1.

Note: It should be noted that the Moroccan higher education system is in line with the French LMD (Bachelor's-Master's-Doctorate) higher education system. There are some slight differences between the French system and the international system. For instance, it has been possible to obtain a bachelor's degree in Morocco in only three years since the 2003 education reform.

The explanatory variables are classified into three categories. The first category contains the explanatory variables that represent the demographic characteristics of the individual and his/her geographical environment. These variables are the individual's sex, area of residence, marital status, and the age group the individual belongs in. According to hiring discrimination theory, a possible explanation

Table 1 Data description

Variables	Modalities
Labor market states	0: Employed 1: Unemployed
Sex	0: Male 1: Female
Area of residence	0: Rural area 1: Urban area.
Marital status	0: Single 1: Married 2: Others
Age group	0: 15 - 18 years of age 1: 19 - 24 years of age 2: 25 - 29 years of age
The highest degree (1)	0: The individual has no diploma 1: The individual holds a high-school diploma or a lower-level diploma 2: The individual holds a two-year undergraduate degree or a bachelor's degree 3: The individual holds a master's or engineering degree 4: The individual holds a PhD 5: The individual holds a two-year professional diploma
The highest degree obtained by the household head	0: The individual has no diploma 1: The individual holds a high-school diploma or a lower-level diploma 2: The individual holds a two-year undergraduate degree or a bachelor's degree 3: The individual holds a master's or engineering degree 4: The individual holds a PhD 5: The individual holds a two-year professional diploma
The number of employed workers per household	0: No workers 1: One worker 2: Two workers 3: Three workers 4: Four workers, or more

Source: Authors

for young female unemployment could be employers' prejudice against women for irrational reasons. It could also be systemic, historical, or cultural (Aigner & Cain, 1977). In addition, the young people who live in urban areas are less likely to be unemployed compared to those living in rural areas (Harris & Todaro, 1970). Finally, the marital status is also one of the factors that influence the possibility of being unemployed. The fact that a young person is married reduces his/her chances of being unemployed as newlyweds may find themselves forced to work to support themselves and fulfill their familial obligations (Tasci & Tansel, 2005). Faced with this situation, they are ready to voluntarily accept the jobs that do not correspond to their qualifications. The last variable in this category is the age group the individual belongs in given the fact that older individuals are perceived by employers to have more professional experience. In general, employers prefer recruiting experienced professionals to fresh graduates.

The second category of explanatory variables contains the variables representing the characteristics of the individual's education. The highest diploma obtained by the individual classified by the educational institution type (universities, engineering schools, and professional training institutions) are used as a proxy for this variable. The literature on the impact of higher education on employment is ambiguous. On the one hand, higher education increases workers' skill level and allows them to integrate in a bigger part of the labor market. On the other hand, the higher the worker's education, the lower the job opportunities in the market that meet their reservation wage requirements. In addition, educated workers find themselves to be overqualified in local markets dominated by the jobs that require unskilled labor.

The third category represents a set of socioeconomic factors. These variables allow for the analysis of the individual's familial environment and the impact of the level of education and the financial stability of the household on the chance of being unemployed. The first variable in this group considers parents' education. Educated parents can comparatively offer better financial support for quality education and can also offer their offspring training on job search and networking opportunities. The second variable is a proxy for the financial stability of households.

RESULTS

In this section, the initial model estimation, the specification and validation tests, as well as the final model estimates are presented.

The initial model estimation

Choosing the right logit model given a multitude of the explanatory variables is based on the contribution of each variable to the accuracy of the model's predictions. The modeling process starts with the estimation of the multiple iterations of the initial "step 0" model that only accounts for the constant. The -2LL statistic is computed for each iteration and the iteration that minimizes the -2LL statistic is retained. The consequent steps (i.e. models) are specified using the forward selection method based on the significance of the score statistic. The results of this analysis show that all the explanatory variables have a significant score statistic[2].

The cross-classification analysis of the initial model allows evaluation of the predictive accuracy of the "step 0" model. The analysis shows that the sample contains 19,590 employed and 5,999 unemployed individuals. By classifying all the individuals into those employed (the most frequent event), the "step 0" model correctly classifies 76.6% of the individuals. This value will be used later as the baseline to assess the quality of the model.

The final model selection and validation

As is discussed before, three statistics are used to evaluate the model fit (Table 2). The best model is the one with the highest value of Cox et Shell's and Nagelkerke R-squared and the lowest -2LL statistics. The value obviously rises for each step, and it can be concluded that the final model is the best fit.

Table 2 The model fit statistics

Step	-2LL	Cox et Shell R2	Nagelkerke R2
7	15686.45	0.379	0.571

Source: Authors

Using the McFadden (1974) Pseudo-R-squared statistic, the final model can be said to predict 44% of the variance in the outcome.

Examining the cross-classification tables of each estimated step allows choosing the best step. As is shown before, the "step 0" model correctly classifies 76.6% of the sampled young people. The results[3] of the cross-classification analysis show that the steps 2 to 6 steadily increase the model's accuracy so as to reach 86.5%, which is the highest accuracy. However, the step 7 model is slightly less accurate than the step 6 one (86.4% versus 86.5%, respectively), but the benefit of the added independent variable outweighs the loss of 0.1% of the model accuracy. Finally, to ensure that the model is adjusted well to the data and that it effectively predicts the group which it belongs in, the list of the observations with the standardized residual value greater than 2 is analyzed, simultaneously paying attention to those located within the three standard deviations. A total of 495 of the total of 25,589 young people are found to have the residual values of more than three standard deviations, which represents 2% of the sample.

Results interpretation

Table 3 summarizes the estimation results of the final model. It presents the coefficients associated with each variable, their standard errors, the odds ratios, and the confidence intervals for each odds ratio.

The obtained results confirm all the research hypotheses (H1-H7) set at the beginning of the paper. The analysis of the indicators of the individuals' demographic and sociodemographic characteristics reveals some interesting findings. First, being a woman increases the probability of unemployment. The probability of unemployment for a woman is 1.7 times greater than that of a man. Second, unemployment in Morocco is an urban phenomenon, that is to say individuals living in rural areas are 37.3% less likely to be unemployed. Third, young single people are more likely to be unemployed. As the results show, being married reduces the probability of being unemployed by 80%. In addition, being widowed or divorced reduces the probability of being unemployed by 71%. Finally, the chance of being unemployed decreases with the individual's year of age. For instance, young people aged 15 to 18 are 3.4 times more likely to be unemployed than those of 25 to 29 years of age. These results are supportive of discrimination theory and show the vulnerability of young single females to unemployment. The greater chance that the married will find employment can be attributed to the effects of familial responsibilities on the reduction of reservation wages.

The results pertaining to the individuals' education and training account for the fact that young graduates are more likely to be unemployed than young people without diplomas. Remarkably, the impact of having a diploma on the probability of being unemployed varies according to the type of the diploma obtained. Compared to the reference category, young people with a high-school degree or a lower-degree diploma stand a 2.2 times as great a chance of being unemployed. However, the chances of individuals holding other types of diplomas are far greater. Notably, the individuals with a two-year undergraduate degree or a bachelor's degree are the most vulnerable segment of educated youth to employment (OR = 7.3). Furthermore, the holders of a master's or engineering degree are better off compared to the holders of a bachelor's degree, but they are still worse off than the young people with a high-school degree. Obtaining a master's or engineering degree significantly increases the probability of being unemployed compared to the reference category (OR = 3.6). In addition, vocational training is still ineffective in reducing unemployment as professional diploma holders are still 4.7 times more likely to be unemployed compared to the reference category, but they are still better off than the holders of the degrees requiring the same number of the years of study (2-3-year undergraduate degrees). Finally, the results reveal that the additional years of education necessary to obtain a PhD degree do

Table 3 The logit regression results

Modalities	β	OR	CI (95%)	
Sex (Ref. = Male)				
Female	0.545*** (-0.046)	1.725	1.576	1.889
Residence (Ref.= Urban)				
Rural	-0.467*** (0.053)	0.627	0.565	0.695
Marital status (Ref. = Single)				
Married	-1.609*** (0.085)	0.2	0.169	0.236
Other	-1.236*** (0.215)	0.29	0.19	0.443
Age group (Ref. = [25-29])				
[15-18]	1.216*** (0.072)	3.372	2.926	3.886
[19-24]	0.749*** (0.046)	2.116	1.934	2.315
The highest degree obtained (Ref. = No diploma)				
A high-school diploma or a lower-level diploma	0.805*** (0.061)	2.236	1.983	2.522
A two-year undergraduate degree or a bachelor's degree	1.989*** (0.09)	7.305	6.126	8.71
A master's or engineering degree	1.287*** (0.139)	3.624	2.762	4.754
PhD	1.529*** (0.467)	4.612	1.845	11.528
A two-year professional diploma	1.541*** (0.083)	4.668	3.968	5.493
The highest degree obtained by the head of the household (Ref. = No diploma)				
A high-school diploma or a lower-level diploma	-0.36*** (0.052)	0.698	0.63	0.773
A two-year undergraduate degree or a bachelor's degree	-0.889*** (0.143)	0.411	0.311	0.544
A master's or engineering degree	-1.099*** (0.209)	0.333	0.221	0.502
PhD	0.155 (0.368)	1.168	0.568	2.402
A two-year professional diploma	-0.651*** (0.123)	0.521	0.41	0.663
The number of employed workers per household (Ref. = Four workers or more)				
No worker	24.969 (897.583)	6.98E+13	0	-
One worker	3.505*** (0.129)	33.281	25.846	42.853
Two workers	1.755*** (0.129)	5.783	4.488	7.451
Three workers	0.752*** (0.14)	2.121	1.614	2.789
Constant	-4.799*** (0.141)	0.008		

Note: *, ** and *** indicate the 10%, 5% and 1% significance levels, respectively.

Source: Authors

not improve the young people's chances of finding a job. The probability of being unemployed for young people with a PhD exceeds that of the young people who have only obtained a master's or engineering degree.

Finally, the results show the influence the socioeconomic factors exert on unemployment. For instance, the risk of becoming unemployed decreases with an increase in the level of the education of the head of the household (in terms of the years of study). Furthermore, the number of active workers in the individual's household influences his/her probability of being unemployed. The results show that the number of active workers in the household considerably reduces the probability of being unemployed as the probability of being unemployed compared to the reference category (4 or more employed workers) ranges from 33.3 times for the young people living in households with only one person employed to 2.1 times for those living in households with three people employed.

CONCLUSION

The characteristics of youth unemployment in Morocco are explored using the micro-level data sourced from the Labor Force Survey of 2019. Based on the literature review, a total of seven hypotheses were set about the determinant of youth unemployment in Morocco. To verify these hypotheses, a logit model was estimated to determine the impact of education and various individual and environmental characteristics on youth unemployment. The results obtained confirm all the research hypotheses (H1-H7) set herein, in particular the sex, age, the area of residence, the marital status, the diploma of the head of the household, and the number of active workers per household, all being the determinants of youth unemployment in Morocco. Among these factors, the sex and age have the most significant influence on the probability of being unemployed. These results can be considered as the evidence of sex- and age-based discrimination and they can be interpreted using the paper by G. S. Becker (1957) who argued that certain groups were less represented in the labor market because of the recruiters' unwillingness to interact with them as a result of one's personal taste or prejudice, as D. J. Aigner and G. G. Cain (1977) argue. Age-based discrimination could also be interpreted using human capital theory, which implies that younger workers could be less recruited because they had less time to acquire the necessary professional experience. The results support the recent studies by F. Berahou and A. Abdouni (2021) and Y. Idhadj and K. Louizi (2021), but contradict the earlier research done by B. Boudarbat (2006), who found that being a woman did not affect unemployment, suggesting that the female unemployment rate was due to the fact that female workers prioritized their family obligations of labor market participation. This shift could be the result of the changing attitude of women towards employment during the last two decades.

The worker's family background also affects his/her access to the labor market given the fact that better educated parents can offer better professional orientation to their offspring. The number of employed workers in the household could also be correlated with its financial stability and capacity to offset costs associated with job search and mobility, as argued by I. Njifen (2015). These results are in line with the M. Bougroum *et al* (2002) earlier findings. It should be noted that family support, financial or otherwise, is often a factor neglected in the reviewed literature and deserves further analysis in future studies.

In addition, the results show that young graduates (regardless of the diploma they may have) are more likely to be unemployed than young people without diplomas (the reference category). These results are in line with the B. Boudarbat (2006) findings that the level of schooling increases the probability of unemployment, which could be explained by a mismatch between the number of the skilled workers that graduate from higher education institutions and the number of the vacancies that require skilled workers. However, in a fashion similar to J. Ait Soudane *et al* (2020) and F. Berahou and A. Abdouni (2021) findings, the influence of higher education on the probability of being unemployed is shown to vary according to the type of the diploma obtained. These

illustrate the key differences in returns on higher education investment in terms of unemployment. This finding can be explained using human capital theory. The quantitative mismatch between the supply and demand of skilled workers may play the key role in explaining unemployment amongst youth graduates. Furthermore, J. Ait Soudane *et al* (2020) suggest that additional characteristics such as social capital and soft skills are needed to allow graduates to find employment.

Overall, the results obtained in this paper show that youth unemployment can be explained by a multitude of factors. The theories explored in the literature review all play a role in explaining youth unemployment. These results are in line with M. Bougroum *et al* (2002) conclusion that there is no unique theoretical explanation for youth unemployment in Morocco.

The results obtained in this study are not without limitations, either. The scope of the results is mainly limited by the nature of the micro-level data used in this study. For instance, being a cross-sectional dataset, NES does not allow for an analysis of the evolution of non-immutable characteristics over time. In addition, while the logit model provides a great insight into the impact of the worker's characteristics on his/her access to the labor market, on the one hand, it does not answer the question "why", on the other. In other words, the results show young workers' unemployment-relevant characteristics without informing about the reason for such importance.

The analysis made in this paper can be a valuable step point for future research. For instance, it would be interesting to explore the reasons lying behind the observed impact of the types of diplomas on the probability of being unemployed so as to investigate why graduates from some programs are more successful in finding jobs than others. A mixed-methods approach can be valuable in investigating such issues by also gaining an insight into recruiters' perspectives.

ENDNOTES

1 The sample used in this study was obtained as a part of an internship carried out by the first author within the Statistics Department of the HCP.

2 Due to space limitations, these results are not reported, but they are available from the authors upon request.

3 Due to space limitations, these results are not reported, but they are available from the authors upon request.

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Received on 4th October 2022,
after revision,
accepted for publication on 21th April 2023.
Published online on 27th April 2023.

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ISTRAŽIVANJE NEZAPOSLENOSTI MLADIH U MAROKU: DOKAZ NA TEMELJU PODATAKA NA MIKRO NIVOU

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U ovom radu se istražuje nezaposlenost mladih u Maroku. Istraživanje se zasniva na podacima iz Ankete o radnoj snazi iz 2019. godine sa ciljem procene logističkog modela. U radu se iznose dokazi za tri kategorije mogućih determinanti nezaposlenosti među mladima u Maroku. Prvi skup determinanti čine geografske i sociodemografske karakteristike poput pola, godina starosti, bračnog statusa i prebivališta. Drugo, socioekonomski faktori poput porodičnog miljea mladih i broja zaposlenih lica u domaćinstvu igraju odlučujuću ulogu u objašnjenju razloga za nezaposlenost među mladima u Maroku. Treće, i na kraju, rezultati dobijeni u ovoj studiji pokazuju da (bez obzira na to koje diplome poseduju) postoji veća verovatnoća da će mladi svršeni studenti biti nezaposleni nego što je to slučaj sa osobama koje nemaju nikakvu diplomu. Međutim, uticaj koji vrsta diplome koju neka osoba poseduje ima na verovatnoću da će ta ista osoba biti nezaposlena varira u zavisnosti od toga o kojoj vrsti diplome je reč. Dobijeni rezultati bacaju svetlo na bitne karakteristike nezaposlenosti među mladima u Maroku i trebalo bi da posluže kao smernica za buduća istraživanja specifičnijih praznina u znanju.

Ključne reči: tržište rada, nezaposlenost mladih, nezaposlenost svršenih studenata, kvalifikovani rad, logistički model

JEL Classification: J21, J24, J64, J71

Ekonomski horizonti, Januar - April 2023, Volumen 25, Sveska 1, 71 - 84
UDC: 33 ISSN: 1450-863 X

www. ekfak.kg.ac.rs

Pregledni članak
UDK: 001.895:364-3
doi:10.5937/ekonhor2301071A

EFEKTI UMREŽAVANJA NA INOVATIVNOST SOCIJALNIH PREDUZEĆA

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U radu se istražuje povezanost umrežavanja i inovativnosti socijalnih preduzeća. Istraživanje je motivisano idejom da se razume uticaj umrežavanja na inovativnost ove posebne vrste organizacija, koje zbog svoje hibridne prirode imaju potencijal da odgovore na ekonomske i društvene izazove današnjice. Istraživanje je zasnovano na uzorku od 837 socijalnih preduzeća iz 11 evropskih zemalja. Rezultati su pokazali da je umrežavanje jedna od ključnih odlika ovih organizacija, jer više od 90% ispitivanih organizacija sarađuje sa drugim organizacijama, ali i da, samo po sebi, umrežavanje ne utiče na inovativnost socijalnih preduzeća. Detaljnija analiza pokazuje razlike koje oblici umrežavanja i starost organizacije imaju na inovativnost.

Ključne reči: umrežavanje, inovativnost, socijalno preduzetništvo, organizaciona starost

JEL Classification: M14, O31, O35

UVOD

Ovaj rad istražuje faktore koji pokreću inovativnost socijalnih preduzeća. Istraživanja poslovanja socijalnih preduzeća u Republici Srbiji (Žarković-Rakić, Aleksić-Mirić, Lebedinski & Vladisavljević, 2017; Aleksić Mirić, Petrović & Aničić, 2018; Aleksić Mirić, Petrović & Aničić, 2019) pokazuju da su najvažniji sledeći pokretači inovativnosti: svest o njihovoj društvenoj misiji; stav da su inovacije važne; finansiranje dobijeno kroz grant šeme, i uključivanje vlasnika, odbora, kupaca i nevladinih organizacija u sistem donošenja odluka u organizaciji. Istraživanja socijalnih preduzeća u Evropi pokazuju da na inovativnost utiču i: dostupnost finansiranja (Schätzlein, Schlütter & Hahn, 2023); promene u spoljnom okruženju; orijentacija preduzeća ka rastu; zapošljavanje plaćenog osoblja umesto volontera; prethodno iskustvo u osnivanju/upravljanju socijalnim preduzećem; motivacija za rad u/sa socijalnim preduzećem; zadovoljstvo profesionalnim životom; nivo obrazovanja, i invaliditet.

Cilj istraživanja predstavljenog u ovom radu je razumevanje efekata koje umrežavanje ima na inovativnost ove posebne vrste organizacija, koje zbog svoje dualne prirode (Searing, Poledrini, Young & Nyssens, 2022) i nastojanja da ostvare istovremeno

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i ekonomske i socijalne ciljeve u skladnom balansu (Cho, Kim & Oh, 2022; Mas-Machuca, Akhmedova & Marimon, 2023), privlače sve veću pažnju stručne i akademske javnosti i imaju potencijal da odgovore na ekonomske i društvene izazove današnjice.

U radu se ispituje i eventualno postojanje razlika u ponašanju socijalnih preduzeća u zavisnosti od njihove starosti, pa su tako sva ispitivana preduzeća svrstana u dve grupe:

- „stara" generacija preduzeća, koja uključuje organizacije koje su osnovane u periodu od 1944. godine do 2000. godine, i
- „nova" generacija preduzeća, koja uključuje organizacije osnovane posle 2000. godine.

Navedeno može da bude sistematizovano kroz sledeća istraživačka pitanja (IP):

IP 1a. Da li umrežavanje značajno utiče na inovativnost socijalnih preduzeća?

IP 1b. Da li svi oblici umrežavanja utiču na inovativnost socijalnih preduzeća?

IP 2a. Da li starost socijalnih preduzeća menja zaključke o uticaju umrežavanja na inovativnost?

IP 2b. Koji oblici umrežavanja utiču na inovativnost u "novoj" i "staroj" generaciji socijalnih preduzeća?

IP 3. Koji faktori utiču na inovativnost u "novoj" i "staroj" generaciji socijalnih preduzeća?

Rad je strukturiran na sledeći način: drugi deo predstavlja pregled relevantne literature, treći deo objašnjava korišćenu metodologiju, četvrti deo iznosi rezultate istraživanja koji su praćeni diskusijom u petom delu, dok se u šestom delu, u formi zaključka, rezimiraju saznanja do kojih se u istraživanju došlo.

PREGLED LITERATURE

Pitanja umrežavanja i socijalnih preduzeća su relativno skoro privukla veću pažnju u akademskim istraživanjima. Nedavno objavljena analiza D. Littlewood i Z. Khan (2018) odražava sistematski pregled literature o socijalnim preduzećima i mrežama. Na osnovu pregleda 77 vrhunskih časopisa u oblasti poslovne ekonomije i menadžmenta, izvode zaključak da postoji porast interesovanja za istraživanje odnosa između socijalnih preduzeća i mreža, raznovrsna primena mrežne perspektive, koncepata i teorija, raznovrsna istraživačka metodologija i još uvek veoma veliki prostor za dalja istraživanja.

U kritičkom pregledu literature o organizacionim inovacijama, R. A. Wolfe (1994) je identifikovao tri glavna toka istraživanja: (1) istraživanje o širenju inovacija, koje se fokusira na istraživanje obrazaca širenja inovacije kroz populaciju potencijalnih organizacija koje ih usvajaju; (2) istraživanje inovativnosti organizacije, koje se fokusira na istraživanje onoga što određuje organizacionu inovativnost, i (3) istraživanje teorije procesa, koje se bavi pitanjem procesa kroz koje organizacije prolaze u implementaciji inovacija. Pokretači organizacione inovativnosti, kako ih je identifikovao R. A. Wolfe (1994), uglavnom se ispituju u okviru druge i treće oblasti istraživanja. U okviru ovog istraživačkog korpusa, pojavilo se nekoliko važnih tema:

- *Značaj inovativnosti u različitim kontekstima*. (1) inovacije i svest o njihovom značaju (Alegre & Chiva, 2008; Madhoushi, Sadati, Delavari, Mehdivand & Mihandost, 2011; Aleksić Mirić *et al*, 2018); (2) inovacije i prethodno iskustvo i obrazovanje (Maidique & Hayes, 1984; Lefebvre & Lefebvre, 1992; Kolvereid, 1996; Shane, 2000; Charney & Libecap, 2000; Kuratko, 2005; Ucbasaran, Westhead & Wright, 2009); (3) inovacije i životna sredina (Lawrence & Lorsch, 1967; Miller & Friesen, 1983; Davis, Morris & Allen, 1991; Russell & Russell, 1992; Naman & Slevin, 1993; Damanpour & Gopalakrishnan, 1998; Tidd, 2001; Koberg, Detienne & Heppard, 2003; Jansen, Van Den Bosch & Volberda, 2006); (4) inovativnost i veličina kompanije (Schumpeter, 1942; Rothwell & Zegveld, 1982; Acs & Audretsch, 1987; Arrow, 1993; Rogers, 2004; Wagner & Hansen, 2005; Laforet, 2008; Erić Nielsen, 2015);

- *Inovativnost i umrežavanje*. Glavni izvor inovacija se postepeno seli iz pojedinačne firme u njenu mrežu (Pittaway, Robertson, Munir, Denyer & Neely, 2004; Rogers, 2004; Eggers, Kraus & Covin, 2014; Chesbrough & Bogers, 2014; Mokhtarzadeh, Mahdiraji, Jafarpanah, Jafari-Sadeghi & Cardinali, 2020; Hilmersson & Hilmersson, 2021); primarni motiv za povezivanje nije samo smanjenje troškova ili smanjenje rizika, već i olakšani pristup komplementarnim tehnologijama (Narula, 2004; Savović, Zlatanović & Nikolić, 2021), sticanje novih ili komplementarnih kompetencija ili osvajanje novih ili komplementarnih tržišta (Pittaway *et al*, 2004), kao i ubrzani ulazak na tržište proizvoda (Hilmersson & Hilmersson, 2021); mrežne veze ne samo da proširuju bazu znanja MSP već im omogućavaju lakši pristup tehničkim i komercijalnim resursima (Parida, Pemartín & Frishammar, 2009); previše umrežavanja, takođe, može dovesti do smanjenja ukupne inovativnosti (Lee, Ginn & Naylor, 2009);
- *Saradnja sa različitim tipovima partnera utiče na inovativnost kompanije*. Saradnja sa sličnim kompanijama je mnogo važnija za unapređenje inovativnog učinka kompanija nego povezivanje kompanija sa istraživačkim institucijama, posredničkim institucijama i vladinim agencijama (Zeng, Xie & Tam, 2010); značajna je uloga potrošača, dobavljača, konkurenata, konsultanata, univerziteta i vladinih organizacija (De Jong & Hulsink, 2012); uloga konfiguracije mreže i određenih tipova partnera u kreiranju inovacija (Pittaway *et al*, 2004).

METODOLOGIJA ISTRAŽIVANJA

Podaci koji se koriste u ovom radu prikupljeni su u *online* istraživanju. Izabranim ispitanicima je putem elektronske pošte poslat link za pristupanje upitniku zajedno sa objašnjenjem koje je sadržalo svrhu istraživanja i koristi koje mogu imati od učešća u istraživanju. Ispitanici su bili punoletni vlasnici ili menadžeri socijalnih preduzeća. U slučajevima kada osnivači, odnosno, vlasnici nisu bili u mogućnosti da odgovore na upitnik, to su radile osobe kojima su osnivači delegirali autoritet za upravljanje organizacijom i donošenje odluka. Uzorak se sastoji od 837 socijalnih preduzeća koja posluju u jedanaest evropskih zemalja. Obuhvaćene su sledeće zemlje: Albanija, Austrija, Danska, Engleska, Francuska, Nemačka, Italija, Poljska, Srbija, Škotska i Holandija[1].

Upitnik je bio podeljen u nekoliko modula. Prva tri modula su sadržala pitanja o ličnim karakteristikama ispitanika (pol, starost, obrazovanje, prethodno iskustvo u osnivanju ili upravljanju socijalnim preduzećima, motivacija) i o opštim karakteristikama preduzeća (kao što su: tip, veličina prema broju zaposlenih, vlasnička struktura, godina osnivanja, oblast ekonomskog delovanja, godišnji obrt). Ostali moduli su sadržali pitanja vezana za sledeće dimenzije socijalnih preduzeća: pristup finansijama, glavni izazovi i ograničenja socijalnih preduzeća, uloga inovativnosti tokom životnog ciklusa preduzeća, uticaj različitih kategorija stejkholdera na proces donošenja odluka u preduzeću i pitanja o socijalnom kapitalu preduzeća.

Inovativno socijalno preduzeće (ISP) je definisano kao organizacija koja je inovirala u poslednje tri godine, odnosno, preduzeće čiji je vlasnik ili menadžer odgovorio sa "da" na pitanje: "Da li je Vaša organizacija inovirala u oblasti proizvoda, procesa, finansija ili marketinga u poslednje 3 godine?" Ostala preduzeća, čiji su menadžeri ili vlasnici odgovorili sa "ne" na to pitanje, svrstani su u kategoriju neinovativnih socijalnih preduzeća (NISP). U ovom radu koristimo i termine "nova" i "stara" generacija socijalnih preduzeća. Naime, "stara" generacija preduzeća uključuje organizacije koje su osnovane u periodu od 1944-2000, dok "nova" generacija preduzeća uključuje organizacije osnovane posle 2000.

Statistička analiza je sprovedena korišćenjem t-testa za testiranje jednakosti srednjih vrednosti, z-testa za testiranje jednakosti proporcija, hi-kvadrat testa i odabranih neparametarskih testova da bi se potvrdili rezultati dobijeni korišćenjem parametarskih testova. Za numeričke varijable je korišćen t-test za testiranje jednakosti aritmetičkih sredina između inovativnih i neinovativnih socijalnih preduzeća. Kako su

ponuđeni odgovori na pojedina pitanja definisani prateći logiku Likertovih stavki (1 - u potpunosti se ne slažem; 2 - ne slažem se; 3 - niti se slažem niti se ne slažem; 4 - slažem se, i 5 - u potpunosti se slažem), rezultati parametarskih testova su provereni primenom neparametarskih testova. Rezultati te analize su pokazali identične nalaze. Za donošenje statističkih odluka korišćen je nivo značajnosti od 0,05. Rezultat statističkih analiza u slučaju kada je testirana nulta hipoteza o jednakosti aritmetičkih sredina ili proporcija je u tabelama prikazana simbolima "="/"Ne" ili "≠"/"Da". U slučaju kada se nulta hipoteza ne odbacuje, korišćeni su simboli "=" ili "Ne", što znači da testirani faktor ne utiče na ispitivanu pojavu. Kada se nulta hipoteza o jednakosti aritmetičkih sredina ili proporcija odbacuje, korišćeni su simboli "≠" ili "Da", što znači da faktor utiče na ispitivanu pojavu, tj. na inovativnost. Skoro sve korišćene varijable u ovom istraživanju, posebno ključne varijable kojima se meri inovativnost i umrežavanje, su kategorijske, pa je upotreba naprednijih statističkih tehnika ograničena[2].

REZULTATI ISTRAŽIVANJA

Nakon sprovođenja statističke analize, dobijeni rezultati podeljeni su na tri dela: saradnja u okviru iste oblasti poslovanja; saradnja između socijalnih preduzeća i inovativnost; i organizaciona starost, saradnja i inovativnost.

Saradnja u okviru iste oblasti poslovanja

Da bi se odgovorilo na prvo istraživačko pitanje, sproveden je test proporcija po kolonama i testirana je nulta hipoteza da inovativna i neinovativna socijalna preduzeća u istoj meri (proporciji) sarađuju sa ostalim preduzećima u oblasti poslovanja (Tabela 1). Naime, u drugoj koloni stoji znak "=", što znači da je procenat inovativnih socijalnih preduzeća koja su sarađivala sa ostalim organizacijama statistički jednak procentu neinovativnih socijalnih preduzeća koja su sarađivala sa drugim organizacijama. U skladu sa tim, može se zaključiti da saradnja, tj. umrežavanje, nema efekta na inovativnost socijalnih preduzeća. Iz Tabele 1 se može videti da 90% ispitanih organizacija jeste sarađivalo sa drugim organizacijama u oblasti poslovanja. Ovo se odnosi kako na inovativna, tako i na neinovativna preduzeća.

Tabela 1 Umrežavanje i inovativnost - poređenje proporcija po kolonama

Pitanje/ Faktor	Rezultati testa		Inovativnost	
			ISP	NISP
Da li sarađujete sa drugim preduzećima u oblasti vašeg poslovanja?	=	Da	93,7%	91,2%
		Ne	6,3%	8,8%

Izvor: Autori

Radi boljeg uvida u oblike saradnje socijalnih preduzeća, analizirana je struktura saradnje ispitivanih preduzeća. Rezultati u Tabeli 2 ukazuju da ispitanih preduzeća u najvećoj meri sarađuju sa drugim socijalnim preduzećima (82.7%), zatim sa lokalnim samoupravama (75.1%), privatnim sektorom (64%), organizacijama civilnog društva (61.2%) i, najmanje, sa organima vlasti na nacionalnom nivou (48.5%).

Tabela 2 Intenzitet saradnje

Organizacije	Procenat ispitanika	Odgovori	
		N	Procenat
Ostala socijalna preduzeća	82,7%	535	24,9%
Lokalna samouprava	75,1%	486	22,7%
Organizacije civilnog društva	61,2%	396	18,5%
Privatna preduzeća	64,0%	414	19,3%
Državni organi	48,5%	314	14,6%
Ukupno	331,5%	2145	100%

Izvor: Autori

Saradnja između socijalnih preduzeća i inovativnost

Kao što je navedeno u uvodu, mnoge studije pokazuju da umrežavanje utiče na inovativnost preduzeća. Šta je to različito u ovom istraživanju i zašto rezultati pokazuju da umrežavanje ne utiče na inovativnost socijalnih preduzeća? Jedno objašnjenje može biti da oblik saradnje utiče na ovu vezu.

Detaljnija analiza pokazuje da saradnja sa ostalim socijalnim preduzećima utiče na inovativnost socijalnih preduzeća. Statistička analiza pokazuje da inovativna socijalna preduzeća sarađuju više sa ostalim socijalnim preduzećima. Drugi oblici saradnje ne pokazuju uticaj na inovativnost socijalnih preduzeća. Ovo pokazuje Tabela 3 u drugoj koloni.

Tabela 3 Saradnja i organizaciona inovativnost - poređenje proporcija po kolonama

Organizacije	Rezultati testa		Inovativna socijalna preduzeća	
			Da	Ne
Ostala socijalna preduzeća	≠	Da	85,8%	73,5%
		Ne	14,2%	26,5%
Lokalna samouprava	=	Da	75,7%	71,1%
		Ne	24,3%	28,9%
Organizacije civilnog društva	=	Da	62,3%	53,0%
		Ne	37,7%	47,0%
Privatna preduzeća	=	Da	67,1%	56,6%
		Ne	32,9%	43,4%
Državni organi	=	Da	48,8%	39,8%
		Ne	51,2%	60,2%
Ukupno			416	83

Izvor: Autori

U prvom redu Tabele 3 testirana je nulta hipoteza da je procenat saradnje sa ostalim socijalnim preduzećima u inovativnim i neinovativnim preduzećima isti. Rezultati poređenja proporcija po kolonama pokazuju da se ova nulta hipoteza odbacuje, tj. procenat saradnje ISP sa ostalim socijalnim preduzećima je statistički veći nego procenat saradnje NISP. U ostalim redovima, testirane su nulte hipoteze da je procenat ostalih oblika saradnje inovativnih i neinovativnih preduzeća isti. Znak u drugoj koloni posmatrane tabele je "=" što znači da se nulta hipoteza ne odbacuje.

Organizaciona starost, saradnja i inovativnost

Da bi se ispitao uticaj starosti preduzeća na povezanost umrežavanja i inovativnosti i koji oblici umrežavanja utiču na postizanje inovativnosti u "staroj" i "novoj" generaciji socijalnih preduzeća, testiran je uticaj oblika saradnje na inovativnost (Tabela 4). Naime, u organizacijama koje su osnovane pre 2000. godine, na inovativnost utiče saradnja sa drugim socijalnim preduzećima, lokalnom samoupravom, civilnim društvom i državnim organima. Konkretno, ISP u statistički većem procentu sarađuju sa drugim socijalnim preduzećima, lokalnom samoupravom, organizacijama civilnog društva i državnim organima nego NISP. U organizacijama koje su osnovane posle 2000. godine, nije dokazano postojanje uticaja tipa saradnje na inovativnost, odnosno, isti je intenzitet saradnje u ISP i NISP.

Na osnovu rezultata, ali i prema tvrdnjama u teoriji, može se zaključiti da je 2000. godina prekretnica u načinu na koji se preduzeća umrežavaju za važnost umrežavanja u inovativnom ponašanju socijalnih preduzeća. Iako se pokazalo da je umrežavanje važan faktor za inovativno ponašanje socijalnih preduzeća osnovanih pre 2000. godine, njegov značaj se gubi u novom milenijumu. Ovaj rezultat objašnjava činjenica da nakon 2000. godine umrežavanje postaje duboko usađeno u svakodnevno funkcionisanje organizacija svih vrsta, na način da je postalo neophodan uslov poslovanja. U tom kontekstu, umrežavanjem se mogla podsticati inovativnost pre 2000. godine, ali je posle 2000. godine umrežavanje postalo poslovna praksa neophodna za opstanak *per se*.

Rezultati koji se tiču razlike između "stare" i "nove" generacije socijalnih preduzeća usmerili su istraživanje ka drugim razlozima za takve nalaze.

Tabela 4 Saradnja i inovativnost organizacija u "staroj" i "novoj" generaciji preduzeća - poređenje proporcija po kolonama

Organizacija		1944-2000			2001-2010		
		Inovativnost		Rezultati testa	Inovativnost		Rezultati testa
		ISP	NISP		ISP	NISP	
Ostala socijalna preduzeća	Da	92,1%	62,1%	Da (≠)	83,8%	79,6%	Ne (=)
	Ne	7,9%	37,9%		16,2%	20,4%	
Lokalna samouprava	Da	81,2%	51,7%	Da (≠)	73,6%	81,5%	Ne (=)
	Ne	18,8%	48,3%		26,4%	18,5%	
Organizacije civilnog društva	Da	65,3%	27,6%	Da (≠)	61,7%	66,7%	Ne (=)
	Ne	34,7%	72,4%		38,3%	33,3%	
Privatna preduzeća	Da	66,3%	51,7%	Ne (=)	68,3%	59,3%	Ne (=)
	Ne	33,7%	48,3%		31,7%	40,7%	
Državni organi	Da	54,5%	24,1%	Da (≠)	46,9%	48,1%	Ne (=)
	Ne	45,5%	75,9%		53,1%	51,9%	
Ukupno		101	29		303	54	

Izvor: Autori

Stoga, ispitano je da li se uticaj pojedinih faktora na inovacije razlikuje u "staroj" i "novoj" generaciji socijalnih preduzeća. Rezultati ispitivanja uticaja različitih faktora na inovativnost su prikazani u četiri tabele sa četiri iste kolone (Tabela 5, Tabela 6, Tabela 7 i Tabela 8). U prvoj koloni prikazana su pitanja u upitniku koja predstavljaju faktore čiji je uticaj ispitivan. U ostalim kolonama je dat rezultat statističke analize kao „Da", kada rezultati impliciraju da taj faktor utiče na inovativnost, ili kao „Ne", kada rezultati impliciraju da taj faktor ne utiče, ili su navedeni oblici uticaja faktora koji utiču na inovativnost. Druga kolona prikazuje rezultate testiranja za sva anketirana socijalna preduzeća, treća za "staru generaciju" i poslednja kolona prikazuje rezultate testiranja za "novu generaciju" socijalnih preduzeća. Faktore koji utiču na inovativnost kako u "starim" tako i u preduzećima "nove generacije" prikazuje Tabela 5. Faktore koji ne utiču na inovativnost ni u "staroj" ni u "novoj" generaciji prikazuje Tabela 6. Tabela 7 i Tabela 8 prikazuju faktore koji utiču na inovativnost u "starim" ali ne i u preduzećima "nove generacije" i faktori koji utiču na inovativnost u preduzećima "nove" ali ne i "stare" generacije.

Rezultat "Da" prikazan u tabelama, kao što je već navedeno, prikazuje uticaj pojedinačnog faktora na inovativnost socijalnih preduzeća, tj. procenat ISP koja su odgovorila potvrdno je statistički različit (veći) od procenta NISP koja su na isto pitanje dala potvrdan odgovor. Naime, rezultat "Ne" znači da je procenat ISP koja su odgovorila potvrdno jednak procentu NISP koji su odgovorila potvrdno. Na primer, Tabela 7 u preseku prvog reda i treće kolone daje rezultat testiranja uticaja zapošljavanja radnika koji rade za platu na inovativnost. "Da" u toj ćeliji znači da u "staroj generaciji" socijalnih preduzeća ISP zapošljavaju radnike koji rade za platu u statistički različitom (većem) procentu u odnosu na NISP, tj. zapošljavanje radnika koji rade za platu utiče na inovativnost u "staroj generaciji" socijalnih preduzeća.

Tabela 5 Faktori koji utiču na inovativnost i u "novoj" i u "staroj" generaciji preduzeća

Pitanje/Faktor	Faktor utiče na inovativnost		
	Sva	"Stara generacija"	"Nova generacija"
Da li je jedan od ciljeva Vaše organizacije doprinos u rešavanju nekog društvenog ili ekološkog problema?	Da	Da	Da
U kojoj meri ste uopšte zadovoljni vašim profesionalnim životom?	Da	Da	Da
Koji od sledećih izvora finansiranja su dostupni za socijalna preduzeća u Vašoj zemlji?	Lična štednja, *Crowdfunding*, Mikro-kreditiranje, Socijalne investicije, Privatne investicije,	Lična štednja, Privatne investicije	Grantovi od projekata, Donacije, *Crowdfunding*, Privatne investicije
Na koji način je vaša organizacija došla do sredstava da započne svoju aktivnost?	Krediti banaka	Donacije/ *Fundrasing*	Krediti banaka, Grantovi od projekata, Lična štednja
Koliko su inovacije važne za početnu fazu razvoja vaše organizacije u smislu proizvoda, procesa, finansija, ili marketinga?	Da	Da	Da
Koliko su takve inovacije važne sada?	Da	Da	Da
Da li su inovacije nastale kao posledica promene u Vašem spoljašnjem okruženju?	Da	Da	Da
Mreža poslovnih odnosa moje organizacije je velika.	Da	Da	Da
Uticaj potrošača i korisnika na donošenje odluka o vašoj organizaciji	Da	Da	Da
Uticaj organizacija trećeg sektora i nevladinih organizacija (NVO) na donošenje odluka o vašoj organizaciji	Da	Da	Da
Vrste angažovanja zainteresovanih strana (stejkholdera)	Prikupljanje povratnih informacija, anketa i evaluacija o zadovoljstvu korisnika, Angažman zainteresovanih strana (stejkholdera) u izveštavanju o aktivnostima, Društveni mediji	Društveni mediji	Javni sastanci, Prikupljanje povratnih informacija, anketa i evaluacija o zadovoljstvu korisnika, Društveni mediji

Izvor: Autori

DISKUSIJA

Izneti rezultati pružaju odgovore na pitanja: "Kakav je uticaj umrežavanja na inovativnost socijalnih preduzeća?"; "Kakvi su efekti koje različiti oblici umrežavanja imaju na inovativnost socijalnih preduzeća?"; "Da li organizaciona starost menja dobijene rezultate i zašto umrežavanje ne utiče na isti način na inovativnost u "staroj" i "novoj" generaciji socijalnih preduzeća?" Nalazi se mogu sumirati na sledeći način:

- *Uticaj homogenosti umrežavanja na inovativnost*. Rezultati pokazuju da 90% anketiranih socijalnih preduzeća sarađuje sa drugim organizacijama u oblastima svog poslovanja. Ovaj nalaz se odnosi i na ISP i na NISP. Ako se detaljnije analizira sa kim socijalna preduzeća sarađuju, uočava se da ona najviše sarađuju sa drugim socijalnim preduzećima (82,7%), zatim sa lokalnim vlastima (75,1%), privatnim preduzećima (64%), organizacijama civilnog društva (61,2%) i državnim organima (48,5%). Detaljnija analiza

Tabela 6 Faktori koji ne utiču na inovativnost ni u „staroj" ni u "novoj" generaciji preduzeća

Pitanje/Faktor	Faktor utiče na inovativnost		
	Sva	"Stara generacija"	"Nova generacija"
Da li je osnovni prihod Vaše organizacije nezavisan od grantova, donacija, zaveštanja ili poklona?	Ne	Ne	Ne
Da li se profit Vaše organizacije makar delimično koristi za finansiranje osnovne delatnosti?	Ne	Ne	Ne
Da li ste Vi osnivač organizacije?	Ne	Ne	Ne
Da li Vam vaša trenutna funkcija omogućava da odlučujete o/upravljate najvažnijim pitanjima organizacije (na primer, strategija, ciljevi organizacije, aktivnosti koje treba pokrenuti, organizacija timskog rada)?	Ne	Ne	Ne
Da li se neki član vaše porodice bavi/se bavio preduzetništvom?	Ne	Ne	Ne
Ljudi u mojoj organizaciji generalno efikasno sarađuju jedni sa drugima.	Ne	Ne	Ne
Generalno, mogu da sarađujem sa ljudima u mojoj organizaciji.	Ne	Ne	Ne
Uticaj akcionara / investitora na donošenje odluka	Ne	Ne	Ne
Uticaj države i javne uprave na donošenje odluka	Ne	Ne	Ne
Pol ispitanika	Ne	Ne	Ne
Da li ste u toku školovanja učestvovali u stručnom obrazovanju ili obuci koja je relevantna za Vaš posao?	Ne	Ne	Ne

Izvor: Autori

otkriva da saradnja sa drugim socijalnim preduzećima utiče na inovativnost preduzeća, odnosno, da inovativna preduzeća u statistički većoj meri sarađuju sa drugim socijalnim preduzećima. Ostali ispitivani oblici saradnje nisu pokazali da utiču na inovativnost preduzeća.

- *Smanjenje važnosti umrežavanja za inovativnost*. U "staroj generaciji" preduzeća umrežavanje utiče na inovativnost. Naime, ISP u statistički većem procentu sarađuju sa drugim socijalnim preduzećima, lokalnim vlastima, organizacijama civilnog društva i državnim organima nego NISP. U "novoj generaciji" preduzeća nije utvrđen uticaj umrežavanja na inovativnost. Drugim rečima, nema statistički značajne razlike u saradnji ISP i NISP sa drugim ispitivanim oblicima organizacija.

Da bi se objasnilo zašto je uticaj umrežavanja na inovativnost različit u "staroj" i "novoj" generaciji socijalnih preduzeća, urađena je detaljnija analiza uticaja faktora na inovativnost pre i posle 2000. godine.

Rezultati ove analize pokazuju da su faktori koji utiču na inovativnost i u "starim" i u preduzećima "nove generacije" sledeći: doprinos rešavanju društvenog ili ekološkog problema kao cilja socijalnog preduzeća; zadovoljstvo profesionalnim životom uopšte; izvori finansiranja za socijalna preduzeća u zemlji; izvori finansiranja za pokretanje organizacione aktivnosti; važnost inovacija proizvoda, procesa, finansija ili marketinga u početnoj fazi razvoja organizacije; važnost inovacija u trenutnoj fazi; nastanak inovacija kao odgovor na promenu spoljašnjeg okruženja; velika mreža poslovnih odnosa; uticaj potrošača i korisnika na donošenje odluka; uticaj organizacija trećeg sektora i NVO na donošenje odluka, i korišćene prakse angažovanja zainteresovanih strana. Faktori koji ne utiču na inovativnost ni u "starim" ni u preduzećima nove generacije" su: nezavisnost osnovnog prihoda organizacije od grantova, donacija, zaveštanja, ili poklona; ulaganje profita u finansiranje osnovnih delatnosti; faktori u vezi sa ispitanikom (ispitanik je osnivač preduzeća, porodična istorija preduzetništva ispitanika, pol ispitanika); mogućnost ispitanika da

Tabela 7 Faktori koji utiču na inovativnost u "staroj" ali ne i u "novoj" generaciji preduzeća

Pitanje/Faktor	Faktor utiče na inovativnost		
	Sva	"Stara generacija"	"Nova generacija"
Da li Vaša organizacija zapošljava radnike koji rade za platu?	Da	Da	Ne
Da li ste, pre ovog socijalnog preduzeća, nekada bili uključeni u osnivanje nekog drugog socijalnog preduzeća?	Da	Da	Ne
Da li ste, pre ovog socijalnog preduzeća, nekada upravljali nekim drugim socijalnim preduzećem?	Da	Da	Ne
Šta je Vaš osnovni motiv da radite u/osnujete socijalno preduzeće?	Da	Da Stvaranje mogućnosti za lično zaposlenje	Ne
Koja sredstava trenutno koristite za svoju aktivnost?	Grantovi od projekata	Grantovi od projekata, Donacije/ *Fundrasing*	Ne
Uticaj vlasnika/upravnog odbora na donošenje odluka	Da	Da	Ne
Uticaj zaposlenih na donošenje odluka	Da	Da	Ne
Uticaj zajednice na donošenje odluka	Da	Da	Ne
Generalno verujem ljudima u mojoj organizaciji.	Da	Da	Ne

Izvor: Autori

Tabela 8 Faktori koji utiču na inovativnost u "novoj" ali ne i u "staroj" generaciji preduzeća

Pitanje/Faktor	Faktor utiče na inovativnost		
	Sva	Stara generacija	Nova generacija
Da li Vaša organizacija obavlja neku privrednu delatnost, kao što je prodaja proizvoda ili pružanje usluga?	Ne	Ne	Da
Da li je za Vašu organizaciju važno da raste? (na primer, rast broja ili vrsta aktivnosti, rast broja zaposlenih)	Da	Ne	Da*
Uticaj dobavljača na donošenje odluka	Da	Ne	Da
Ljudi u mojoj organizaciji generalno veruju jedni drugima.	Da	Ne	Da
Koji je vaš najviši stečeni nivo obrazovanja?	Da Fakultet, Osnovne studije	Ne	Da*
Da li se identifikujete kao osoba sa teškim invaliditetom ?	Da	Ne	Da

Napomena: * označava statistički značajne rezultate pri nivou značajnosti 0,1.

Izvor: Autori

donosi odluke/upravlja važnim pitanjima u preduzeću (npr. strategija, ciljevi preduzeća, aktivnosti koje treba voditi, organizacija timskog rada); efikasnost timskog rada; saradnja sa članovima tima; uticaj akcionara/ investitora na donošenje odluka; uticaj državne i javne uprave na donošenje odluka; relevantno stručno obrazovanje ili obuka.

Dalja analiza pokazuje grupu faktora čiji je uticaj različit kod preduzeća "stare" i "nove" generacije. Faktori koji utiču na inovativnost u starim, ali su prestali da utiču u socijalnim preduzećima osnovanim posle 2000. godine su: zapošljavanje radnika koji rade za platu (umesto volontera); učešće u osnivanju socijalnog preduzeća pre ovog; istorija upravljanja

socijalnim preduzećem ispitanika; glavna motivacija za rad u/osnivanje socijalnog preduzeća; načini finansiranja delatnosti; uticaj vlasnika/upravnih odbora na donošenje odluka; uticaj zaposlenih na donošenje odluka; uticaj zajednice na donošenje odluka; poverenje ispitanika u ljude u timu.

Postoji nekoliko faktora koji nisu uticali na inovativnost u staroj generaciji preduzeća, ali su počeli da utiču u novoj generaciji preduzeća: obavljanje neke privredne delatnosti, kao što je prodaja roba i pružanje usluga; važnost organizacionog rasta (npr. povećati broj ili opseg aktivnosti, zaposliti više zaposlenih); uticaj dobavljača na proces donošenja odluka; poverenje među članovima tima; najviši stečeni nivo obrazovanja; i činjenica da je ispitanik osoba sa teškim invaliditetom.

ZAKLJUČAK

Osnovni cilj ovog rada bio je da istraži efekte umrežavanja na inovativnost socijalnih preduzeća. Rezultati su pokazali da je umrežavanje odlika socijalnih preduzeća, kao i saradnja sa drugim organizacijama, normalan način njihovog funkcionisanja i da je to činjenica nezavisno od inovativnosti-neinovativnosti kao karakteristike preduzeća. Podrobnija analiza je pokazala da saradnja sa drugim socijalnim preduzećima jeste odlika inovativnih u odnosu na neinovativna socijalna preduzeća, što ide u prilog zaključku da „sličan-sličnog" podržava u inovativnosti. U tom smislu, podsticanje međusobne saradnje socijalnih preduzeća, kroz različite oblike formiranja formalnih ili neformalnih socijalih mreža, zajednica saradnje i interorganizacionih povezivanja, može imati pozitivan efekat na njihovo umrežavanje, budući da ostali ispitivani oblici saradnje nisu pokazali da utiču na inovativnost preduzeća. Rezultati su pokazali i da umrežavanje ima veći uticaj na inovativnost u "staroj" nego u "novoj" generaciji socijalnih preduzeća.

Ovo istraživanje omogućava bolje razumevanje poslovanja socijalnih preduzeća u pogledu njihove inovativnosti i umrežavanja, kao i faktora koji na njih mogu uticati. Kada je reč o ograničenjima, ovaj rad je napisan na osnovu podataka prikupljenih iz 11 evropskih zemalja. Stoga se relevantni zaključci odnose na ove zemlje, sa ograničenom mogućnošću primene u drugim kontekstima. Da bi se proverila valjanost ovih zaključaka u drugim zemljama, trebalo bi sprovesti nova istraživanja. Uzorak socijalnih preduzeća nije slučajan, što se može smatrati nedostatkom. Skoro sve korišćene varijable u ovom istraživanju, posebno ključne varijable "inovativnost" i "umrežavanje", su kategorijske, pa je upotreba drugih naprednijih statističkih tehnika ograničena.

ENDNOTE

1 Ove zemlje su bile uključene u istraživanje pod pokroviteljstvom FP7 projekta Omogućavanje procvata i razvoja socijalnog preduzetništva za inovativna i inkluzivna društva (Enabling the Flourishing and Evolution of Social Entrepreneurship for Innovative and Inclusive Societies) i za njih su istraživačima bili dostupni zbirni podaci.

2 Zbog velikog broja tabela u kojima se nalaze rezultati testova sa p-vrednostima, rezultati sa originalnim izlazima iz SPSS softvera mogu se naći u Dropbox folderu na sledećem linku: https://www.dropbox.com/sh/n8fnyasb78ip41s/AAARVl4r2szACAYGuEVyEIJoa?dl=0.

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Primljeno 4. decembra 2022,
nakon revizije,
prihvaćeno za publikovanje 21. aprila 2023.
Elektronska verzija objavljena 27. aprila 2023.

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NETWORKING EFFECTS ON SOCIAL ENTERPRISES' INNOVATIVENESS

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In the paper, the connection between networking and the innovativeness of social enterprises is explored. The research is motivated by the idea of understanding the impact of networking on the innovation of this special type of organizations that, due to its hybrid nature, has the potential to respond to today's economic and social challenges. The research based on a sample of 837 social enterprises from 11 European countries. The results showed that networking was one of the key features of these organizations, as more than 90% of the surveyed organizations cooperated with other organizations, but also that networking itself did not affect the innovation of social enterprises. A more detailed analysis shows the differences that the networking forms and organizational age have on innovation.

Keywords: networking, innovativeness, social enterprises, organizational age

JEL Classification: M14, O31, O35

Ekonomski horizonti, Januar - April 2023, Volumen 25, Sveska 1, 85 - 99
UDC: 33 ISSN: 1450-863 X

Review paper
UDC: UDC: 336.71:004.738.5(594)
doi:10.5937/ekonhor2301085S

SMART GOVERNANCE: PAYMENT TRANSACTION ELECTRONIFICATION ACCEPTANCE IN NORTH SUMATRA PROVINCE, INDONESIA

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The policy of the electronification of regional payment transactions (ERPT) is one of the innovations implemented by Indonesia due to the COVID-19 pandemic so as to increase the economic activity and revenue. This study is aimed at increasing the understanding of smart governance, the contactless economy, and regional income in North Sumatra Province, Indonesia, and globally the new normal and the post-COVID-19 eras. This research study was carried out using the primary data obtained through questionnaires in 2021 applying the purposive sampling method and processed using the Structural Equation Model-Partial Least Square (SEM-PLS) models. Based on the six hypotheses proposed in this study, the results show that performance expectancy, the social influence, and the facilitating condition have a positive and significant impact on the behavioral use of the noncash payment transactions of taxes and levies in North Sumatra Province. On the other hand, the effort expectancy has no significant impact on the cashless transaction of paying taxes and levies in the North Sumatra Province.

Keywords: contactless economy, smart governance, regional payment transaction electronification

JEL Classification: G28, H59

INTRODUCTION

The COVID-19 pandemic has generated a new trend in people's behavior. It was initially the contact economy, where individuals had to be physically present, whereas now the economy has become contactless (Manimuthu, Dharshini, Zografopoulos, Priyan & Konstantinou, 2021). This behavior requires that relevant stakeholders should develop an appropriate technology, such as digital payments, which is necessary for the industrial era 4.0 (Brunkhorst, 2020; Trütsch, 2020; Faturohman, Farras Ar Rasyid, Rahadi, Darmansyah & Afgani 2021). Through technology, all trade transactions, public services, tourism and financial services are encouraged to be carried out without any face-to-face contact (Lee &

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Lee, 2020; Baber & Tripati, 2021; Yamin, Darmawan & Rosyadi, 2021), which is possible to achieve if there are trailblazers encouraging the implementation of digitalization in every region and in every country.

As the regulators and providers of public services, governments have played a major role in ensuring people's welfare, and as the driving instrument of the country's progress (Liu & Qi, 2021). The same situation is also visible in Indonesia, where the Indonesian Government plays the major role in the population's wellbeing at both the regional and the national levels (Nartin & Musin, 2022).

Since 2019, the Indonesian Government has been using a technology-based strategic approach better known as "smart governance" so as to implement smart city programs in 100 Indonesian cities/districts (Anindra, Supangkat & Kosala, 2018; Yudono, Satria & Erlando, 2019; Firman, Sumatono, Muluk & Setyowati, 2022). In this sense, the COVID-19 pandemic is/was the momentum for the Indonesian and regional governments to digitize regions in order to implement the "smart governance" approach. The implementation of smart governance is to promote regional revenues and build a resilient region through price and inflation control; access to digital financial literacy; e-tourism-based tourism development; e-commerce-based micro-, small and medium-sized business development, and so forth (Yudono *et al*, 2019; Pareti, Flores, Gonzalez & Pareti, 2022). Smart governance in Indonesia plays the major role in the COVID-19 era and the new normal with the aim to overcome various social issues, especially so when the economy in urban areas is concerned (Firman *et al*, 2022).

North Sumatra Province is one of Indonesia's urban areas managed applying smart governance. Since 2020, the North Sumatra Provincial Government has taken advantage of the COVID-19 momentum to accelerate, implement and develop the policy of the electronification of regional payment transactions (ERPT) through the noncash payment of taxes and levies. This policy was implemented as a resilience strategy intended to increase the gross domestic product (GDP) optimization and encourage economic growth in North Sumatra Province. The implementation of the ERPT policy in North Sumatra Province in 2020-2021 had to face various obstacles in the field. One of them was the weak digital mindset of the community to make noncash payments of taxes and levies through the digital system. The related studies by J. Erjavec and A. Manfreda (2022) note that people are often afraid of adopting or reluctant to adopt a new system in their lives.

The research studies linking smart governance, the contactless economy, and regional income are very limited, especially in Indonesia. Over the last ten years, the largest portion of the research related to smart governance, the contactless economy, and regional income has been done separately. This study was carried out so as to fill the gap in the literature and to increase the understanding of smart governance, the contactless economy, and regional income in North Sumatra Province, Indonesia, and globally as well. Furthermore, the research for the largest part focuses on the cashless payment system of the consumer's preference and growth in the economy, whereas this research is focused on the impact of the contactless economy on regional income and the development of government revenue.

The research study was carried using the ERPT as the main subject so as to investigate and examine the acceptance of the noncash payments of taxes and levies policy implemented by smart governance in North Sumatra Province. The main data used in this study are the primary data collected through a survey in the form of an online questionnaire in the nine cities/districts with the implemented ERPT by Bank Indonesia, North Sumatra Province, in 2021. Then the data were processed and analyzed using the SEM-PLS (Structural Equation Model-Partial Least Square) models.

LITERATURE REVIEW

Regional financial transaction electronification

Financial transaction electronification is a response to the development of the digital world in the financial sector, which aims to create a technology-based effective and efficient payment system (Lee & Lee, 2020). The development of the digital payment system has attracted the attention of the government and other policymakers in that it made them review and develop the digital financial system that is safe, practical, efficient, and contactless for users/the public (Yue, Korkmaz, Yin & Zhou, 2022). T. Trütsch (2020) stated that, through the development and utilization of digital payment systems, people tended to increase consumption, which had a positive effect on the value of transactions made. It happens because noncash payments reduce the transaction costs that occur when cash payments are made (e.g. the costs of the time needed to make transactions) (Trütsch, 2020).

The development of financial transaction electronification in Indonesia has been carried out since 2014, marked by the implementation of the "*Gerakan Nasional Non Tunai*" or the "National Noncash Movement" (NNCM) in Indonesia. The NNCM is the noncash payment policy based on the automatic teller machine (ATM), debit, credit, and e-money cards to create the *Less Cash Society* (LSC) ecosystem in Indonesia (Kusumastuti & Tinangon, 2019). Initially, the noncash payments based on the NNCM policy were carried out utilizing inter- or intrabank transfers, which on its part resulted in the inefficiency of noncash transaction electronification due to a large number of ATMs and Electronic Data Capture (EDC) that had to be provided, as well as high interbank transaction fees. To overcome this issue, Bank Indonesia (BI) issued the National Payment Gateway (NPG) policy, the interbank network system in Indonesia initiated by Bank Indonesia, which had previously been concentrated on international payment products, such as Visa and Mastercard, to integrate and streamline cashless payment channels nationally (Kusumastuti & Tinangon, 2019).

In 2020, global digital financial transactions underwent a rapid reform and growth due to the economic shock caused by COVID-19 (Fu & Mishra, 2022). This growth was made possible because, during COVID-19, it was difficult for people to leave their homes and make economic transactions in cash. The same condition also occurred in Indonesia, marked by the implementation of safety measures so as to prevent the spread of the COVID-19 virus, such as Large-Scale Social Restrictions (*Pembatasan Sosial Berskala Besar*), health protocols in the new normal era, and many others (Wibowo & Hariadi, 2022). This condition certainly forces people to shift from cash payments to noncash payments.

Since then, the Indonesian government has perceived the cashless payments trend as the opportunity to reform and accelerate the electronification of the national financial transactions that enable inclusive and sustainable economic growth through the use and advancement of the existing financial-based technologies, such as e-commerce, Quick Response Code Indonesia Standard (QRIS), and Internet Banking. Policymakers believe that the acceleration of the implementation of the financial transaction electronification policy is vital in order to promote the digital economic ecosystem that may trigger consumption and facilitate the distribution of financial aid to the public and also minimize negative externalities in the COVID-19 recession era (Li, Kim, Lang, Kauffman & Naldi, 2020; Trütsch, 2020; Suryono, Budi & Purwandari, 2021; Fu & Mishra, 2022; Yue *et al*, 2022). Thus, the Presidential Decree of the Republic of Indonesia Number 3 of 2021 concerning the Task Force for the Acceleration and Expansion of Regional Digitization was issued so as to support the acceleration of the financial transaction electronification policy implementation in Indonesia. Thus, the Electronification of Regional Payment Transactions (ERPT) Policy is being implemented in 34 provinces of Indonesia.

ERPT is an integrated effort to replace cash payments with noncash payments in order to increase the accountability and transparency of the regional financial management. The ERPT regulation begins with the NNCM, which BI and the Government

initiated in 2014 in order to create the LSC. In line with the NNCM, the Presidential Instruction Number 10 of 2016 concerning the Prevention and Eradication of Corruption was issued in 2016 and 2017, one of them containing directions for the acceleration of the implementation of noncash transactions in all ministries/institutions (K/L) and the local governments. The issuance of the Government Regulation Number 12 of 2019 concerning Regional Financial Management implies the promotion of the acceleration of the ERPT program. Circular letters outline the local governments' obligation to implement an electronic-based government system in regional financial management.

The ERPT has a role to support various economic activities, including:

- PAD optimization,
- the improvement of the local government financial management,
- improved access to finance, and
- the systematic reinforcement of financial control.

In its implementation, the electronification of transactions within local government is mapped based on the four indices, namely the level of implementation, the realization of or a contribution to PAD, and strategic readiness and support, which is then measured using a 1-100 scale and divided into the four levels including initiation (0-10), developing (>10-40), advanced (>40-70), and digital (>70-100).

Smart governance

Smart governance is implemented by the government seeking to improve performance or overcome the existing problems in the region through innovation and the use of cutting-edge technology. A government can be called "smart" when it has a clear and equitable division of the roles in its governance process, when it is able to efficiently and effectively manage and use data, involving the community in making decisions on regional governance (Anindra *et al*, 2018; Liu & Qi, 2021; Tomor, Przeybilovicz & Leleux, 2021). In addition, smart governance is also defined as smart government management in order to streamline the economic, political, legal and regulatory sectors, simultaneously without eliminating the existing societal norms and values through the use of technology (Tomor *et al*, 2021). Through the use of technology and the community involvement in government, smart governance aims for data transparency, information, and government policies, as regulated in the Law Number 14 of 2008 on the Openness of Public Information (Mutiara, Yuniarti & Pratama, 2018).

Several studies stated that smart governance usually referred to smart countries or smart cities. In Barcelona, the implementation of technology and information into the governance activity will effectively increase urban growth and the policy impact (Bakici, Almirall & Wareham, 2013). A recent study conducted in Europe has also shown the relevance between a smart city and smart governance based on demographical and geographical uniqueness in the respective area (Tomor *et al*, 2021). The goal of smart governance was the same everywhere, which means it was aimed at efficiently increasing people's welfare through the diverse use of technology (Bakici *et al*, 2013; Mutiara *et al*, 2018; Tomor *et al*, 2021; Pareti *et al*, 2022).

Contactless economy

The contactless economy is an economic revolution in the form of social phenomenon that has led to a shifting trend between society and a market behavior because of safety and health measures in the COVID-19 period (Lee & Lee, 2020; Trütsch, 2020; Manimuthu *et al*, 2021). The contactless economy trend is one of the best momentums to accelerate the application of the equal digitization of the global economy. One of the contactless economy's innovations is the cashless payment method introduced so as to replace cash payments in any and all economic activities (Lee & Lee, 2020; Trütsch, 2020; Bae & Chang, 2021).

Many countries have started implementing the contactless economy in every possible aspect. In Thailand, China, and Nigeria, the governments have begun to implement the contactless economy through the mobile QR Code Payment system drives as a

cashless payment policy in order to support financial transactions for both the public and the private sectors in order for them to be more efficient, more transparent, safer, and at a lower cost. In the exchange activity, people also want a cashless economy system which is user-friendly and safe to use (Yakean, 2020; Manimuthu *et al*, 2021; Zhong & Moon, 2022).

In an earlier study related to smart governance and the contactless economy's qualitative methods, a secondary literacy study (Bakici *et al*, 2013; Yakean, 2020; Liu & Qi, 2021) or an in-depth interview (Tomor *et al*, 2021) were used. Z. Tomor *et al* (2021) pointed out the three factors that had an influence on the smart city:

- the intergovernmental state structure,
- local political power relations, and
- the urban governance model.

Smart governance is created by linking all the three factors.

HYPOTHESIS DEVELOPMENT

In this study, the Unified Theory Acceptance Use of Technology (UTAUT) model is implemented in formulating the hypothesis and in quantitative analysis (Figure 1). UTAUT is a model of the acceptance and use of the latest integrated technology developed by V. Venkatesh, M. G. Morris, G. B. Davis and F. D. Davis (2003). Several economic experts, such as C. M. Chao (2019) and R. A. Ericska, L. A. Maureen Nelloh and S. Pratama (2022) agree upon the fact that UTAUT is the most fitting model to the understanding of research in technological and economic phenomena research. Furthermore, UTAUT combines eight related models, including Theory Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM-TPB), the Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT) in order to explain the acceptance and use of technology based on society or user behavior (Venkatesh *et al*, 2003).

A previous study carried out in China used the UTAUT model to investigate customer behavior when making contactless payments included the following variables: perceived ease of use (PEOU), perceived usefulness (PU), service security (SS), perceived value (PV), and post-adoption behavior (PAB). The result confirmed the fact that the perceived ease of use, perceived usefulness, and service security were the vital antecedents of the perceived value of and user satisfaction when making contactless payments (Zhong & Moon, 2022).

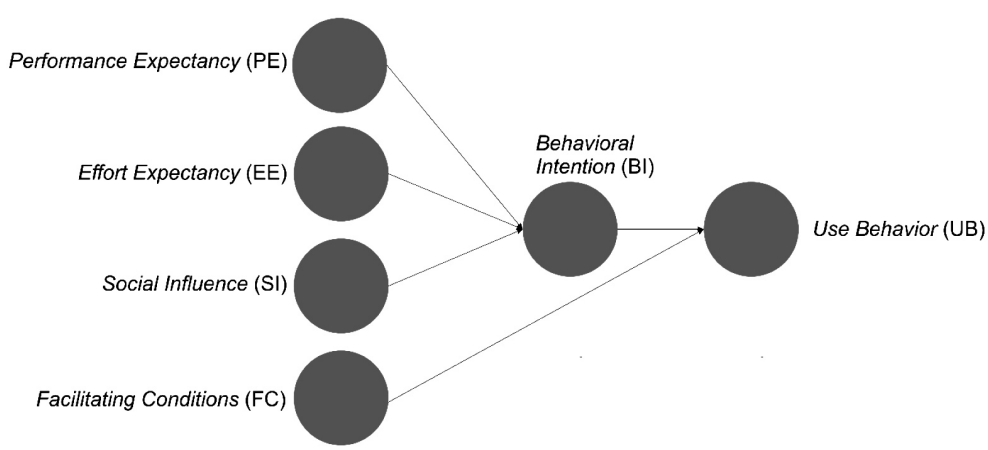

Figure 1 The UTAUT conceptual model

Source: Authors

In the study for Nigeria, Z. U. Mamudu and G. O. Gayovwi (2019) revealed that the positive relationship between ATM, Web/Internet Transfers Payment Value (WEBP) and National Electronic Funds Transfer Value (NEFT) was a result of the e-transaction usage through technology acceptance and the diffusion of the innovation of the cashless payment policy. The results also suggested that Cheques Cleared Value (CHEV), the Point-of-Sale Value (POSV) and Mobile Payment Value (MOBP) had an inverse and insignificant impact on the Gross Domestic Product in Nigeria.

The impact of performance expectancy (PE) on the behavioral intention (BI)

PE is a person's desire to use information technology in order to achieve something. V. Venkatesh *et al*, (2003) define the behavioral intention as a measure of a person's will to behave in a certain way. J. Erjavec and A. Manfreda (2022) state that society is more likely to accept and use digital technology if it is perceived as beneficial and if it offers certain advantages. Testing the PE effect on BI is done so as to determine an individual's feeling about PE concerning ERPT in the cashless payment of taxes and levies in North Sumatra. The hypothesis is formulated as follows:

H1: PE has a positive and significant impact on behavioral intention (BI).

The impact of effort expectancy (EE) on the behavioral intention (BI)

EE is the level of the ease of use associated with the use of the system. It is how easily users can use and learn a new technology or the level of the ease of the system use by the respondents (Venkatesh *et al*, 2003). The EE impact on BI research test variable is used in order to determine how easily users may utilize ERPT to pay for taxes and levies in North Sumatra, taking into consideration the fact that the use of the new technology is becoming a challenge for the elder (Erjavec & Manfreda, 2022). The hypothesis reads as follows:

H2: EE has a positive and significant impact on behavioral intention (BI).

The impact of the social influence (SI) on the behavioral intention (BI)

SI is a variable used so as to see how far an individual believes of the reviews made by the other people who have already used a new system or a new technology as an important consideration prior to trying to use the system themselves (Venkatesh *et al*, 2003). The more positive such reviews on the payment of taxes and levies in North Sumatra are, the more convinced an individual is in their intention to try to do the same thing (Erjavec & Manfreda, 2022). The hypothesis is set as follows:

H3: SI has a positive and significant impact on the behavioral intention (BI).

The impact of the facilitating condition (FC) on the behavioral intention (BI) and user behavior (UB)

FC is a variable used so as to see how far an individual believes the organization and technical infrastructure can support a particular system (Venkatesh *et al*, 2003). The compatibility of the conditions between the digital system supporting facilities and the perception of the public has positive impacts on the people's behavior and desire to use a digital system (Erjavec & Manfreda, 2022). FC was tested through BI and UB in order to determine the compatibility of FC in the ERPT system based on the frequency of payments and the people's desire to continue to use cashless payments to pay for taxes and levies in North Sumatra Province. The proposed hypotheses read as follows:

H4: FC has a positive and significant impact on the behavioral intention (BI).

H5: FC has a positive and significant impact on use behavior (UB).

The impact of the behavioral intention (BI) on user behavior (UB)

BI testing on UB is essential to identify whether the people of North Sumatra Province are interested in the cashless payment of taxes and levies based on the frequency of cashless payments made by the respondents. The more the respondents use the cashless system to pay for taxes and levies, the more interested people are in this system. The hypothesis is proposed to read as follows:

H6: BI has a positive and significant impact on user behavior (UB).

METHODOLOGY AND DATA

This study was carried out quantitatively and it was conducted in nine cities/districts with the assistance of Bank Indonesia, North Sumatra Province, which had already implemented the ERPT policy. The study was being conducted from January to December 2021. The primary data used in the study were collected through a survey in the form of an online questionnaire based on the motivation, perception, and consumer attitudes, i.e. "MAPID" perception, in the UTAUT model. The respondents taking part in this study were chosen using the purposive sampling method so as to determine the number of the samples. This method aims to take samples purposively following the sample requirements (Sugiyono, 2020). This study required a sample of people in the research area (namely the nine cities/regencies that had implemented ERPT in North Sumatra Province) or of those who had paid taxes and levies in the research area.

The data were analyzed using the Structural Equation Model-Partial Least Square (SEM-PLS) model. In addition, the questionnaire in this study also used a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The questions in the questionnaire refer to the previous research related to UTAUT, namely performance expectancy, effort expectancy, the social influence, the facilitating condition, the behavioral intention, and user behavior (Venkatesh *et al*, 2003). Apart from the foregoing, there are also the demographic questions asked in order to obtain more information related to the respondents' gender, age, education, occupation, income, and place of origin.

Table 1 shows the demographic structure of the respondents included in the questionnaire in this research study. The respondents are mainly millennials of 26 to 35 years of age (39.66%) and 36 to 45 years of age (27.16%), especially men (56.82%) from the Pakpak Bharat Regency (17.03%). Moreover, the background education of the largest number of the respondents who had paid cashless taxes and levies implies a high-school diploma (44.54%) and entrepreneurs (42.55%) with an average income mostly ranging from 3 to 5 million rupiahs (43.75%).

RESEARCH RESULTS

This study analyzes the data through the validation and reliability process using outer loading analysis (item loading), average variance extracted (AVE), composite reliability, and discriminant validity (Maureen Nelloh, Santoso & Slamet, 2019).

First, outer loading analysis is applied in the study to each indicator, an indicator having good reliability if the outer loading value is greater than 0.7 (Ericska *et al*, 2022). Based on the results, the test items FC6, SI6, and SI7 have a value lesser than 0.7, namely 0.589, 0.678, and 0.683, respectively. Modifications were made by removing these three items so that data research reliability could be accepted at this stage.

Second, an internal consistency test based on the composite reliability value was done. The research indicator is reliable when the composite reliability value is greater than 0.7 (Amoah & Jibril, 2021). Based on Table 2, the composite reliability value of each indicator is greater than 0.7, which shows that the research indicators have good internal consistency.

Third, a convergent validity test is applied in the study so as to evaluate the value of the average variance extracted (AVE). An indicator is valid when

Table 1 The demographic structure of the respondents

Demographic Variable		Frequency	Percent (%)
Gender	Male	279	56.82
	Female	212	43.18
Age	<25 years old	98	21.12
	26-35 years old	184	39.66
	36-45 years old	126	27.16
	46-55 years old	39	8.41
	55-65 years old	17	3.66
Education	Middle School (SMP)	12	2.57
	High School (SMA)	208	44.54
	Diploma	36	7.71
	Undergraduate	192	41.11
	Post-graduate	19	4.07
Occupation	Entrepreneur	197	42.55
	Private Employee	173	37.37
	Civil Servant	63	13.61
	Military/Police	6	1.30
	Unemployed	24	5.18
Income	< 3 million rupiahs	159	34.27
	3-5 million rupiahs	203	43.75
	5-10 million rupiahs	83	17.89
	>10 million rupiahs	19	4.09
Place of Origin	Pakpak Bharat Regency	79	17.03
	Deli Serdang Regency	55	11.85
	Langkat Regency	52	11.21
	Tebing Tinggi City	48	10.34
	Karo Regency	50	10.78
	Medan City	47	10.13
	Binjai City	47	10.13
	Serdang Bedagai Regency	31	6.68
	Dairi Regency	24	5.17

Source: Authors

its AVE value is greater than 0.5 (Erjavec & Manfreda, 2022). Table 2 shows that all the research indicators of the AVE value are greater than 0.5, thus indicating that all the indicators have convergent validity.

The last step was conducting a discriminant validity test using the Fornell-Larcker criterion (Amoah & Jibril, 2021; Erjavec & Manfreda, 2022). Based on the Fornell-Larcker criterion test results, the facilitating condition and performance expectancy indicators demonstrate a higher correlation value than the other indicators, being 0.836 and 0.903, respectively. Hence, the model modification was performed issuing the indicators with the smallest outer loading results, namely FC1 and PE1, so that the research indicators do have discriminant validity. Overall, the results of the model test can be seen in Table 2.

Table 3 shows the results of the hypothesis testing. The results are obtained by comparing the t-statistic

Table 2 The model test results

Construct	Item	Item Loading	Composite Reliability	AVE	Fornell-Larcker
Behavioral intention	BI1	0.880	0.8780	0.7080	0.841
	BI2	0.737			
	BI3	0.898			
Effort expectancy	EE1	0.913	0.9620	0.8090	0.899
	EE2	0.888			
	EE3	0.928			
	EE4	0.935			
	EE5	0.886			
	EE6	0.843			
Facilitating conditions	FC2	0.881	0.9450	0.6830	0.841
	FC3	0.820			
	FC4	0.881			
	FC5	0.850			
	FC7	0.828			
	FC8	0.771			
	FC9	0.854			
Performance expectancy	PE2	0.896	0.9710	0.8060	0.906
	PE3	0.902			
	PE4	0.885			
	PE5	0.900			
	PE6	0.912			
	PE7	0.929			
	PE8	0.916			
Social influence	SI1	0.792	0.9380	0.7520	0.867
	SI2	0.914			
	SI3	0.893			
	SI4	0.916			
	SI5	0.812			
User behavior	UB1	0.834	0.9130	0.7770	0.882
	UB2	0.916			
	UB3	0.892			

Source: Authors

value with the critical values. If a t-statistic is greater than the critical value, the hypothesis can be accepted, and *vice versa*. Apart from comparing t-statistics with a t-value, hypothesis testing can also be done by comparing a p-value and the 5% significance level. If the p-value is greater than 5% or 0.05, then the hypothesis is rejected, and *vice versa* (Amoah & Jibril, 2021; Ericska *et al*, 2022).

Based on Table 3, it is only Hypothesis 2 that is rejected. In other words, increasing the ease of noncash payments does not necessarily encourage the people of North Sumatra Province to pay taxes and levies using cashless payments. This result is contradictory with the UTAUT model developed by (Venkatesh *et al*, 2003), which states that effort expectancy has a positive and significant effect on the behavioral intention. However, this result is in line with B. Ndekwa, A. J. Ochumbo, A. G. Ndekwa and K. E. John (2018). B. Ndekwa *et al* (2018) found that users' perceptions of the ease of use of the open-source software did not play an important role in the behavioral intentions for the actual use.

Table 3 The statistical test results

Hypothesis		Original Sample	Standard Deviation	t-Statistic	p-value	Decision
H1	PE → BI	0.2200	0.0830	2.6360	0.0090	Supported
H2	EE → BI	-0.1310	0.1130	1.1520	0.2500	Not supported
H3	SI → BI	0.1400	0.0440	3.1590	0.0020	Supported
H4	FC → BI	0.7080	0.0700	10.0450	0.0000	Supported
H5	FC → UB	0.5430	0.1020	5.3440	0.0000	Supported
H6	BI → UB	0.3460	0.1080	3.2150	0.0010	Supported

Source: Authors

DISCUSSION

Based on the results of the hypothesis testing done in this study, the test results regarding the facilitating condition variable (the hypotheses 4 and 5) are indicative of the fact that the infrastructure has the biggest positive impact on the behavioral intention and user behavior. Furthermore, the supporting infrastructure has the biggest influence on the consumer behavior of taxpayers and levies through the cashless option, which is in line with the other studies (Akinnuwesi, Uzoka, Fashoto, Mbunge, Odumabo, Amusa, Okpeku & Owolabi, 2022; Erjavec & Manfreda, 2022) stating that the supporting infrastructure for technology and digitalization has the major role in the acceptance of new technologies in society.

Based on the research results it is evident that the largest number of the people who pay taxes and levies through the cashless system come from certain groups with the education level of at least a high-school diploma or an equivalent to undergraduate studies. Therefore, it is necessary that the digital environment and infrastructure for paying taxes and levies using the cashless system should be equalized by the local governments. This activity is also accordant with Indonesia's smart governance role to create the digital environment at the regional level that includes digital financial transactions, the development of technology, the information and communication (ICT) infrastructure, digitization, data transparency and government systems, as well as the development of transportation and digital education in Indonesia (Mutiara *et al*, 2018; Yudono *et al*, 2019).

As far as the results of the hypothesis 1 testing are concerned, a conclusion can be drawn that the community believes that ERPT in North Sumatra Province will provide relative benefits for users (the community and the local government) through the fulfilment of the performance expectations, namely through facilitating noncash transactions for the local government and the community spending, as well as the other benefits of the use of cashless payment systems such as a discount, a gift, and many more. Studies conducted by the African economic and psychological/behavioral schools of thoughts are commonly used to support tax performance (Olaniyi & Akinola, 2020). Thereby, users will be more confident to use the cashless payment system which they feel is easier, more effective, more efficient, faster, and safer to use than paying in cash. This positive experience will directly increase people's confidence to do the same thing repeatedly, simultaneously influencing others as well (Akinnuwesi *et al*, 2022).

In contrast to the results of the hypotheses 4 and 1 testing, the results of testing the hypothesis 2 actually reveal a discrepancy against the theory stating the effort expectancy of the users' perceptions of the level of the ease of use of technology. According to the results of the hypothesis 2, effort expectancy has a negative and insignificant impact on the behavioral intention, which indicates that increasing the ease of noncash payments does not necessarily encourage

the people of North Sumatra Province to pay for their taxes and regional levies making cashless payments. At present, the public perception of the cashless payment system of taxes and levies in North Sumatra Province is still low and many respondents perceive that paying taxes and levies in cash is still easier than making cashless payments.

The results of the hypothesis 3 testing show that the higher the level of the trust of individuals and/or groups of people (i.e. friends, family, colleagues, and society) in using a particular system, the greater the likelihood that they will recommend the system to others. This result is in line with V. Venkatesh *et al* (2003) who showed that, if others believed in the system, then it would influence other people to use it as well. Based on the survey results, the largest number of the people of North Sumatra perceive the use of cashless payment systems as the lifestyle of modern society, which then affects others to use the system, too. In contrast to that, the respondents also consider the cities/regencies other than the nine fostered districts/cities as underdeveloped areas for various reasons, such as insufficient technological facilities and the insufficient infrastructure to support cashless payments. L. A. Maureen Nelloh *et al* (2019) stated that that kind of the community view would exert a negative influence on and broaden regional economic inequality in the long run. Smart governance plays an important role in eliminating this perspective through the development of technology-based education (Bakici *et al*, 2013).

While previous study focused on the cashless payment system and its influence on the economy, this research study focuses on the impact of electronification on the government payment system. Overall, the study results show that the acceptance of the implementation of the cashless payment of taxes and levies in the North Sumatra Province as one of the regional smart governance policies in Indonesia would be more easily accepted if the public were aware of the positive impact of these cashless transactions and if it were used highly frequently and more intensely. Behaviorally speaking, the cashless payment system that is easier to use, more effective and more efficient than the cash payment system has the potential to provide support to tax performance and users will also be more confident to utilize the cashless payment system if others believe in that system (Venkatesh *et al*, 2003; Olaniyi & Akinola, 2020; Akinnuwesi *et al*, 2022). If many users have a good experience with making cashless transactions, they will anticipate making cashless payments for taxes and levies in the long run and they will try to motivate others to do the same as well. Increasing the number of the people who take advantage of digital innovation by moving from cash payments to cashless payments is the one indicator of governance success in achieving these goals (Ndekwa *et al*, 2018; Yudono *et al*, 2019).

CONCLUSION

In this study, the UTAUT model is implemented in order to determine the public acceptance of the implementation of the smart governance policies on the cashless payment of taxes and levies in North Sumatra Province. The conclusions are based upon the six hypotheses proposed in this study reading that performance expectancy, the social influence, and the facilitating condition have a positive and significant impact on the behavioral use of noncash payment transactions of taxes and levies in North Sumatra Province. On the other hand, effort expectancy has no significant impact on the cashless transactions of tax and levy payments in the North Sumatra Province, which is because the respondents' perceptions of the cashless payment system for taxes and levies in North Sumatra Province are still negative.

Overall, the results of the hypotheses testing are positive and significant to be implemented as the policy development related to ERPT by smart governance. However, because effort expectancy is negative and insignificant with respect to the acceptance of cashless payments of taxes and levies, further research should reaffirm this relationship by expanding the research variables (e.g. using the UTAUT-2 model) or increasing the number of the respondents to be included in the research study.

The problems the authorities were faced with when the ERPT implementation in North Sumatra Province is concerned were the user's interest, the banking infrastructure, HR competence and regional government commitment, and the IT infrastructure. There is still a lack of information about and education in ERPT, particularly so for the payment of taxes and levies in a noncash regime. The public's trust in the capacity of the banking and IT infrastructures to support transactions for the cashless payment of taxes and levies is still lacking, and the imbalance in the quality of the network in each region is a limiting factor to the implementation of ERPT in North Sumatra Province.

In order to increase the public acceptance of noncash transactions, the Government needs to increase promotion, such as education in and socialization with respect to the payment of taxes and levies through digital channels by making educational videos or publications through social media. Education and technical guidance to improve the competence of the local government's human resources is needed so as to provide smoothness in the development of ERPT. In addition to said, the equitable availability of electricity and telecommunications networks and IT devices in all districts/cities, especially in rural/remote areas, improving the server quality and security using blockchain technology, developing a single database and the regional government financial dashboard and local tax applications play an important role in encouraging digitization in North Sumatra Province.

The scope of this study is limited to North Sumatra Province as one of Indonesia's urban areas managed by means of smart governance. However, this research accommodates at least 50 samples in each district, so the respondent can capture the implementation of cashless society and the electronification payment system in this area. This paper suggests that future research could include a larger number of populations, such as island populations or Indonesian, in order to capture electronification development and the government payment system to make a policy suitable for this purpose.

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Received on 15th January 2023,
after two revisions,
accepted for publication on 21th April 2023.
Published online on 27th April 2023.

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PAMETNO UPRAVLJANJE: PRIHVATANJE ELEKTRONIFIKACIJE PLATNIH TRANSAKCIJA U INDONEŽANSKOJ POKRAJINI SEVERNA SUMATRA

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Elektronifikacija regionalnih platnih transakcija (ERPT) samo je jedna od inovacija koje je Indonezija implementirala zbog pandemije COVID-19 da bi povećala ekonomsku aktivnost i prihode. Ova studija ima za cilj da doprinese boljem razumevanju pametnog upravljanja, bezkontaktne ekonomije, i regionalnih prihoda u indonežanskoj Pokrajini Severna Sumatra, ali i globalno u eri nove normale i post-COVID-19 eri. U ovom istraživanju se koriste primarni podaci pribavljeni posredstvom upitnika 2021. godine primenom metoda svrsishodnog uzorkovanja i obrađeni pomoću modela za modeliranje strukturalnih jednačina metodom parcijalnih najmanjih kvadrata (SEM-PLS). U ovoj studiji se dokazuje šest hipoteza. Dobijeni rezultati pokazuju da očekivanja od korišćenja sistema, socijalni uticaj i olakšavajući uslovi imaju pozitivan i značajan uticaj na način na koji se bezgotovinske platne transakcije koriste za plaćanja poreza i dažbina u Pokrajini Severna Sumatra. S druge strane, očekivanja u pogledu stepena lakoće korišćenja sistema vezanog za krajnju upotrebu istog nemaju značajan uticaj na bezgotovinske transakcije kada je u pitanju plaćanje poreza i dažbina u Pokrajini Severna Sumatra.

Keywords: bezkontaktna ekonomija, pametno upravljanje, elektronifikacija regionalnih platnih transakcija

JEL Classification: G28, H59

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

33

EKONOMSKI horizonti / glavni i odgovorni urednik Milena Jakšić. - God. 1, br. 1/2 (1999)- . - Kragujevac: Ekonomski fakultet Univerziteta u Kragujevcu, 1999 - (Kragujevac: InterPrint). - 26 cm

Tri puta godišnje. - Tekst na srp. i engl. jeziku. - Drugo izdanje na drugom medijumu : Ekonomski horizonti (Online) = ISSN 2217-9232
ISSN 1450-863X = Ekonomski horizonti (Štampano izd.)
COBISS.SR-ID 158022663

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