

# The interaction between financial, market and environmental components in the Serbian banking sector

## Interakcija finansijskih, tržišnih i ekoloških komponenti u srpskom bankarskom sektoru

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### Abstract

*Banks are one of the essential institutions in the financial systems worldwide, whereby profitability is the ultimate goal for banks' business. To provide success, bank management should create an attractive market portfolio that will continuously generate profit. However, banks have to support eco-friendly initiatives and projects and try to implement corporate social responsibility in their business. The goal of the research is to investigate the connection between financial, environmental and market components in the banking sector of the Serbia from 2014 to 2021. The empirical findings of T-test indicate that banks with green loans in portfolio registered higher profitability compared to banks that do not offer this loan type. The obtained results of correlation show that green loans and market share are positively correlated to bank profitability indicators. This does not mean that green loans are a factor that shapes banks' profitability, but that their presence in the portfolio does not negatively affect the level of the bank's realized profit.*

**Keywords:** banks, green loans, market share, profitability, Serbia

### Sažetak

*Banke predstavljaju jedne od osnovnih institucija u finansijskim sistemima širom sveta, pri čemu je profitabilnost krajnji cilj poslovanja banaka. Da bi se obezbedio uspeh, menadžment banke treba da kreira atraktivan tržišni portfolio koji će kontinuirano generisati profit. Međutim, banke moraju podržati ekološke inicijative i projekte i pokušati implementirati korporativno društvenu odgovornost u svom poslovanju. Cilj istraživanja je da istraži povezanost finansijske, ekološke i tržišne komponente u bankarskom sektoru Srbije od 2014-2021. godine. Empirijski nalazi T-testa ukazuju da su banke sa zelenim kreditima u portfoliju registrovale veću profitabilnost u odnosu na banke koje ne nude ovu vrstu kredita. Dobijeni rezultati korelacije pokazuju da su zeleni krediti i tržišno učešće pozitivno korelisani sa pokazateljima profitabilnosti banaka. To ne znači da su zeleni krediti faktor koji oblikuje profitabilnost banaka, već da njihovo prisustvo u portfoliju ne utiče štetno na nivo ostvarenog profita banke.*

**Кljučне речи:** banke, zeleni krediti, tržišno učešće, profitabilnost, Srbija


## 1. Introduction

Banks hold a significant role in the business sector, playing a dominant position within the financial system (Mirović et al. 2023). They are considered crucial entities in the financial system (Al-Homaidi et al. 2019), serving as primary sources of financing for the economy and key drivers of sustainable environmental practices (Caby et al. 2022). Similarly, Mirza et al. (2023) defined the role of banking channels to provide the necessary funds that can be used for eco-friendly business activities. Also, Forcella and Hudon (2014) point out that most banks estimate

some environmental risks with their loan policies and report on environmental performance. The banking sectors are recognized as one of the main elements that directly or indirectly affect global climate change (Rehman et al., 2021). Banks are essential in the global economy in terms of achieving profitability, customer confidence and good reputation (Bătae et al., 2021). Similarly, Yip and Bocken (2018), as well as, Aracil et al. (2020) argue that banking sector is important to achieving sustainable development. These organizations represent the important market subjects and should be careful about environmental variations (Chen et al., 2022). Similarly,

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Milićević et al. (2023) highlighted the importance of banks in promoting increased adoption of renewable energy solutions.

The banking sector's in environmental protection is growing, driven by environmentally conscious companies and clients (Sarma & Roy, 2020). Business strategies have shifted from solely focusing on profit maximization to environmental, social, and economic components (Chang et al. 2022). Banks and other financial institutions play a crucial role in promoting green finance and investment initiatives (Taghizadeh-Hesary & Yoshino, 2020). Akomea-Frimpong et al. (2021) underline the green finance concept in conditions of permanent climate change and raise concern for environmental protection at the global level. The role of banks should be manifested in stimulating green finance directed at achieving green transitions (Muganyi et al., 2021). For instance, Khairunnessa et al. (2021) outlined the concept of green banking, highlighting the important role that bank plays in the financial services, environmental and economic progress.

Similarly, the green banking concept implies that banks daily operate according to environmental circumstances (Sharma and Choubey, 2022). Also, Zhou et al. (2022) specified banks as the organization that contributes to economic development from the aspect of collecting and transferring financial sources to productive investments. The greater willingness of banks to offer green loans stimulates innovative green investment (Dafermos et al. 2018). Accordingly, He et al. (2019) highlighted that financial institutions have to make innovative green products and services and enable green financing channels. Thus, banks must endorse environmental initiatives and introduce new products and services which in line with to customers' preference for sustainable options (Al-Quidah et al., 2022). Furthermore, Lei et al. (2021) identified green loans as a key financial instrument for promoting sustainable development. This loan type is a common practice in green finance that seeks to lower pollution. (Xing et al., 2021). Accordingly, Koval et al. (2022) emphasize the need of promoting various green financial instruments. The development of green instruments should enable using the funds raised in the financial market to finance sustainable development (Martin, 2022). Likewise, An et al. (2021) defined green credit financing as the main channel for green investment and support method for environmental companies (Luo et al. 2017). Green loans refer to bank investment related to a net-zero carbon economy by supporting environmentally friendly initiatives and efforts to mitigate climate change (Gilchrist et al., 2021). Also, Miah et al. (2020) suggested that banks should endorse a range of environmentally friendly initiatives, including green loans, green bonds, and other forms of financial supports. Credit policy based on green financing has been profiled as a significant instrument for sustainable development (Li et al. 2022). Specifically, green loans provide borrowing to financial institutions for investments in green, clean energy, circular economy etc. (An et al. 2023).

The paper is structured as follows. The first and second part include introduction and literature review related to the green banking concept and bank profitability. After that, there is a methodological framework which consists developed hypotheses and selected variables. The four part is empirical results and discussion that implies applied descriptive statistics, t-test and correlation between green loans, market share and bank profitability in the Serbia. Finally there is conclusion that summarizes obtained results and recommend future research in direction of improving financial performance of banks by using green products and services.

## 2. Literature review

Banks can enhance liquidity and profitability by applying environment practice and principles in their business (Chen et al. 2018). The empirical study of Deng et al. (2022) confirmed a notable correlation between the efficiency and profitability of commercial banks' green credit funds. Additionally, banks with greater profitability level demonstrate a strong commitment to social responsibility and green financing (Yin et al., 2021). Precisely, Cui et al. (2018) emphasize that presence of green loans has positive implications on financial and environmental performance of banks. Green financing has benefits for different subjects in the market such as stakeholders, managers, bankers, suppliers, scientific and communities (Zheng et al. 2021). There are previous studies that have confirmed positive relationship between green loans and bank profitability (Rahaman et al., 2018; Gangi et al., 2019; Al Mamun and Rana, 2020; Xi et al., 2022; Lian et al., 2022). For example, Rahaman et al. (2018) found significant and positive effect of green financing on profitability of commercial banks in Bangladesh. Further, Gangi et al. (2019) indicate that bank policy based on environment enables greater quality of products and services and higher long-term profitability level. Al Mamun and Rana (2020) determined significant positive connection between green finance and bank profitability in Bangladesh from 2012 to 2019. Similarly, Xi et al. (2022) determined a positive influence of green loans on profitability of banks in China for the observed period 2008-2017. Likewise, green loans have the potential to enhance financial indicators such as ROA and net interest margin (Lian et al. 2022). However, there are empirical researches that have registered a negative impact of green loans on bank profitability (Ratnasari et al., 2019; Song et al., 2019; Wanting, 2020; Chang, 2021; Yin, 2021). Ratnasari et al. (2019) identified the negative influence of green loans on bank profitability in Indonesia for the period 2012-2016. The empirical findings of Song et al. (2019) registered that green loans are negatively related of commercial banks' profitability in China. Also, Wanting (2020) analyzed 15 commercial banks in China for the period 2012-2018 and identified negative effect of green loans on bank profitability. Chang (2021) confirmed negative impact of green loans on bank profitability in China for the analyzed period 2009-2018. Finally, Yin (2021) identified negative effect of green loans on the financial performance of banks in China for the period 2018-2018.

### 3. Methodology and data

This part of the research implies a methodological framework that determines developed hypotheses, variable selection, as well as, applied statistical methods. Specifically, the paper analyzes 22 banks in the Serbia in terms of profitability, market share and presence of green loans in their portfolio. Bank profitability is measured by mostly used financial indicators such as return on assets and return on equity. Market share is measured by total assets of selected banks divided to the total assets of banking sector in the Serbia. Green loans is expressed as a categorical variable, where 0 - banks with green loans in portfolio and 1 - banks without green loans in portfolio. Considering the determined paper's goal, the next hypotheses are developed:

H<sub>1</sub>: Banks with green loans in portfolio had a greater profitability level.

H<sub>2</sub>: Banks with greater market share had a greater profitability level.

After introduction of selected variables and presentation of defined hypotheses, there are descriptive and empirical results related to bank profitability and market share in context of presence of green loans in Serbia for the analyzed period.

### 4. Empirical results

This section provides descriptive statistics of bank profitability and their market share in the Serbia from 2014 to 2021 and manifests T-tests to measure potential difference in bank profitability level in terms of green loans' presence in their portfolio. Finally, there is a correlation matrix to identify examined relationship: bank profitability, market share and green loans for the observed period.

**Table 1.** Descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.
ROA	-0.0093	0.1146	-1.4215	0.1205
ROE	-0.4744	0.6583	-8.3329	0.4766
MS	4.0719	4.3579	0.0553	17.0085

Source: Authors

The results of descriptive analysis indicated that banks registered negative average values of profitability assessed by ROA and ROE for the observed period. Specifically, mean values were -0.009% and -0.474%, while the mean market share of 22 banks was 4.07% for the analyzed period.

**Table 2.** T-test by offering green loans

ROA					
Group	Mean	Std. Err.	Std. Dev.	95% Conf. Interval	
0	0.0114	0.0014	0.0142	0.0086	0.0142
1	-0.0411	0.0215	0.1775	-0.0840	0.0018
combined	-0.0093	0.0087		-0.0265	0.0079
Diff.	0.0525	0.0174		0.0180	0.0869
Ha: diff<0		Ha: diff !=0		Ha: diff>0	
P-value = 0.9985		P-value = 0.0030		P-value = 0.0015	
ROE					
Group	Mean	Std. Err.	Std. Dev.	95% Conf. Interval	
0	0.0634	0.0088	0.9047	0.0458986	0.0810
1	-0.2171	0.1239	1.0225	-0.4645	0.0303
combined	-0.0474	0.0502		-0.1466	0.0516
Diff.		0.100705		0.0818	0.4793
Ha: diff<0		Ha: diff !=0		Ha: diff>0	
P-value = 0.9970		P-value = 0.0059		P-value = 0.0030	

Source: Authors

The results of t-test (p-values less than 0.05) show a statistically significant difference in return on assets and return on equity of observed banks regarding the presence of green loans in their portfolios. Similarly, the results of t-test (p-value less than 0.05) confirm a statistically significant difference in return on equity of selected banks considering the presence of green loans in their portfolios

The correlation matrix identified a significant and positive correlation between green loans and banks profitability indicators ROA and ROE. Likewise, the market share is positively correlated to the banks profitability assessed by ROA at the significance level of 1%.

### 5. Conclusion

The banking sector represents one of the most essential segments of financial construction in the Republic of Serbia. The well-developed banking sector enables various products and services to cover market needs. It is evident that the implementation of green banking practices in the Republic of Serbia is in its early stages (Petrović Randelović et al., 2022). Therefore, bank management should recognize environmental components in their business, so banks have to focus on making eco-friendly portfolio bases on market principles. It implies that banks establish interaction among financial and

**Table 3.** Correlation analysis

Variables	ROA	ROE	GL	MS
ROA	1.000			
ROE	0.9887 (0.000)	1.000		
GL	0.2247 (0.000)	0.2090 (0.005)	1.000	
MS	0.1520 (0.046)	0.1379 (0.0713)	0.5403 (0.000)	1.000

Source: Authors

environmental categories in their activities. To provide greater market share, banks must listen to market needs and design products and services that are in line with customer requirements. This study investigates the connection between financial, environment and market components in the banking sector of the Serbia. The financial components are analyzed through registered bank profitability estimated by ROA and ROE. The environmental component is analyzed through existence of green loans in bank's portfolio, while market component is assessed by the market share of observed banks. The empirical results confirmed that banks registered negative ROA and ROE at average level for the period 2014-2021. The correlation analysis found significant and positive nexus between green loans and bank profitability measured by ROA and ROE. Finally, the obtained findings determined that market share and bank profitability measured by ROA are significantly and positively correlated. These results imply that  $H_1$  and  $H_2$  can be accepted. Precisely, the presence of green loans in banks' portfolio has positive implications to the bank profitability. It does not mean that green loans are primary factor of greater profitability, but this type of loans do not have harmful effect on the bank performance assessed by ROA and ROE. The obtained findings align with previous empirical studies that have confirmed positive relationship between observed variables (Rahaman et al., 2018; Al Mamun & Rana, 2020; Lian et al., 2022). Finally, banks with greater market share achieve higher profitability level estimated by ROA which is in line with the previous studies (Al-Omar & Al-Mutairi, 2008; Chowdhury & Rasid, 2017; Saif-Alyousfi, 2022.) The contribution of the paper is manifested in fact that this is the one of the few studies that analyzes green loans and their implications on bank profitability in the Serbia. According to mentioned, this novelty classifies the research as innovative and good for both the banking and scientific society.

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