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Assessing the Banking Sector of Bosnia and Herzegovina: An Analysis of Financial Indicators through the MEREC and MARCOS Methods

Abstract: The banking sector assumes a pivotal role in the economic development of nations. The assessment of financial indicators pertaining to banks holds fundamental importance in the evaluation of bank stability and sustainability. This research employs the MEREC (Method based on the Removal Effects of Criteria) and MARCOS (Measurement of Alternatives and Ranking according to COMpromise Solution) methodologies to delve deeper into the financial landscape of the banking sector in Bosnia and Herzegovina (BiH). Specifically, the objective is to rank banks according to their financial indicators, utilizing financial data from the year 2022. The MEREC method is applied to gauge the significance of financial indicators and ascertain their respective weights, while the MARCOS method is employed to rank banks within BiH based on their financial indicators. The examination of financial indicators within the BiH banking sector, facilitated by the MEREC and MARCOS methodologies, yields a more comprehensive understanding of the sector's present condition. Limitations of this research, which primarily stem from its reliance on available financial data and predefined methodologies, lies within limited consideration for external factors. To provide a broader contextual perspective, the inclusion of additional financial indicators and comparative analyses with banking sectors of other nations would be imperative. The findings of this research reveal that Raiffeisen Bank exhibits the most favourable financial indicators and demonstrates the highest level of efficiency within this

context. Consequently, this research offers insights into identifying exemplary banks that can serve as models for enhancing the performance of others.

Keywords: financial indicators, banks, Bosnia and Herzegovina, MEREC method, MARCOS method

JEL Classification: C58, C60, G21.

Introduction

Banks and other financial institutions wield substantial influence on the development of contemporary society (Arat, Babuscu & Hazar, 2022), often serving as catalysts for economic growth, particularly in emerging economies (Iqbal & Sami, 2017). However, multiple studies by various authors suggest that the expansion of the banking sector exerts a relatively limited impact on a nation's economic growth (Molchanova & Kovtoniuk, 2023). In some instances, it is even posited that such expansion can precipitate economic disruptions (Topić-Pavković, Kovačević & Kurušić, 2023). Hence, it becomes imperative to closely monitor the activities of banks to facilitate timely interventions should the banking sector commence adversely affecting national development (Rahman, 2022). Developing countries encounter a multitude of challenges in managing their banking sectors, including escalating operational expenses, a rising volume of transactions (Garg et al., 2021), and an expanding array of banking services (Thamae, Odhiambo & Khumalo, 2023). Given the pivotal role banks play in the economy, it is incumbent upon authorities to maintain continuous vigilance over their operations (Marjanović & Popović, 2020) to promptly address potential issues within the financial sector. Through this vigilance, it becomes conceivable to assess whether a particular bank might face insolvency and how such an occurrence would impact the broader banking system within the nation (Bao, Wu & Li, 2020). However, it is essential to acknowledge that such scenarios are shaped by a confluence of factors, of which business indicators represent merely one facet (Bobar, Božanić, Đurić-Atanasievski & Pamučar, 2020). When a bank's operations encounter disruptions, the repercussions often manifest in its financial indicators, rendering these indicators valuable in a preventative capacity, signalling potential issues within the bank. Additionally, these indicators afford a degree of assurance to citizens, influencing their investment choices towards banks boasting superior financial indicators and more favourable financial outcomes.

The transformation in the functioning of the contemporary financial sector has precipitated corresponding changes in the operations of banks. A burgeoning trend toward digitization and the integration of novel information technolo-

gies have gained prominence within banking institutions (Fabris, 2022). Consequently, banks are increasingly expanding their service offerings, catering to a growing array of services accessible to their clientele. These enhanced services, in turn, augment customer satisfaction, engendering greater customer loyalty towards the respective banks (Supriyanto, Wiyono & Burhanuddin, 2021). For instance, clients are presented with a diverse array of online transaction platforms that obviate the need to physically visit a bank for bill payments (Mohd Thas Thaker, Mohd Thas Thaker, Khaliq, Allah Pitchay and Iqbal Hussain, 2022). Consequently, prospective users of banking services face an escalating challenge in selecting the primary bank they entrust with their financial affairs. Among users of banking services, the foundation of this choice pivots upon the safety and stability assured by these banks (Chiaramonte, Dreassi, Girardone & Piserà, 2022). In practical terms, a mounting interest exists in elucidating the influence of accounting and financial indicators on the operations of banking institutions (Wanke, Abul Kalam Azad, Emrouznejad & Antunes, 2019). These indicators hold pivotal significance in the continuous monitoring of bank performance.

To ascertain the operational performance of banks in Bosnia and Herzegovina (BiH), this paper embarks on a two-fold approach. Firstly, it calculates specific financial indicators for all banks, and subsequently employs Multi-Criteria Decision-Making methods (MCDM) to rank these banks based on their financial indicators. This methodology serves a dual purpose: firstly, it quantifies the degree of success achieved by various banks in BiH, and secondly, it identifies the bank with the most favourable financial indicators. The latter is intended to assist potential clients in their selection of a bank, thereby constituting the primary objective of this research. The findings derived from this analysis will delineate the relative positions of the various banks on the ranking list. This valuable insight can guide banks in identifying areas where they need to enhance their financial indicators to optimize their operations.

Additionally, clients will gain access to comprehensive information pertaining to the operational efficacy of individual banks, enabling them to assess the standing of their current bank. For those without an existing banking affiliation, these research outcomes will facilitate an informed choice of a bank with the most robust financial indicators. Through the outcomes of this research, clients will acquire a nuanced understanding of the safety and stability of banks, grounded in the conducted analysis.

The outcomes presented in this paper stem from the amalgamation of financial indicators of businesses with MCDM methods. The calculation of these financial indicators encompasses five distinct categories: liquidity, financial structure, ac-

tivities, market efficiency, and profitability, with supplementary indicators being computed within each of these categories. In conjunction with the MCDM methodology, a hybrid approach will be adopted, integrating the MEREC (Method based on the Removal Effects of Criteria) and MARCOS (Measurement of Alternatives and Ranking according to COMpromise Solution) methods. The utilization of MCDM methods in the analysis and ranking of banks serves to harmonize the diverse array of financial indicators. Each of these indicators will be accorded significance through the computation of weights, a process facilitated by the MEREC method. Subsequently, the banks will be ranked based on the values of the indicators and their respective weights, employing the MARCOS method. This method is meticulously designed to position alternatives in relation to ideal and anti-ideal solutions (Štilić, Puška, Božanić & Tešić, 2023).

Drawing upon its contributions and objectives, this research formulates a hypothesis centered on the premise that the application of a hybrid methodology, integrating the MEREC and MARCOS methods, will facilitate a comprehensive analysis of the pivotal financial indicators within the banks of BiH. This holistic approach is anticipated to yield more precise insights into aspects such as stability, risks, and bank performance.

Furthermore, this research addresses several noteworthy research gaps, namely:

- Previous research has not undertaken the comprehensive calculation of financial indicators for all banks in BiH.
- The fusion of financial indicators with MCDM methods is unexplored within the banking sector in BiH.
- The methodology employed for ranking banks represents an innovative approach that deviates from prior research practices.
- The amalgamation of the MEREC and MARCOS methods for ranking banks and other financial institutions constitutes a unique application, not heretofore employed in similar research endeavours.

In addition to the introduction, this research comprises five distinct sections. The literature review section will provide an overview of prior research utilizing financial indicators and MCDM methods for bank ranking. The methodology and methods section will elucidate the research process and delineate the steps involved in ranking the banks. The results section will involve the initial computation of financial indicators, the subsequent determination of indicator weights, and the ranking of banks in BiH, accompanied by a sensitivity analysis. Within the discussion section, a granular examination of individual indicators will precede an in-depth analysis of the outcomes derived from the MCDM methodology. Conclusively, the research will culminate in the conclusion section, where

the most salient findings will be presented first, followed by a discussion of limitations and the provision of guidelines for prospective research endeavours.

Literature review

The evaluation of financial indicators and the subsequent ranking of banks are fundamental components within modern banking and finance (Chen, Yang, Gan & Pan, 2021; Petropoulos, Siakoulis, Stavroulakis & Vlachogiannakis, 2020). These practices provide a structured framework for assessing the financial health and performance of banking institutions (Bătae, Dragomir & Feleagă, , 2021). In the context of BiH, where the financial sector plays a vital role in economic development and public trust (Hanić & Efendic, 2020), the systematic evaluation of banks based on financial indicators is of paramount importance.

Given this intricate landscape, the need for a robust and standardized assessment of banks (Le, Chuc & Taghizadeh-Hesary, 2019) based on financial indicators cannot be overstated. It serves as a unifying approach to evaluate the health and stability of banks operating across the country's diverse regions and under various regulatory frameworks (Seipp, Michel & Siegfried, 2020; Ullah, Hussain, Nabi & Mubashir, 2022). At the core of this assessment lies a deep understanding of financial indicators. These metrics encompass a broad spectrum of quantitative measures, including liquidity ratios, capital adequacy, asset quality, profitability, and risk management (Adam, Soliman and Mahtab, 2023; Zaidanin & Zaidanin, 2021; Zhao, Li, Yu, Chen & Lee, 2022). They collectively offer a comprehensive view of a bank's capacity to fulfil financial obligations, endure economic uncertainties, and safeguard the interests of depositors (Todosiichuk, 2022).

The practice of ranking banks based on these financial indicators transcends beyond a mere evaluation tool. It serves as a cornerstone for informed decision-making, benefiting both depositors and investors (Moslemi, Zahra & Azita, 2021). Depositors rely on these rankings to identify banks that offer enhanced financial security, thereby alleviating concerns over potential losses due to bank failures (Jiang, Matvos, Piskorski & Seru, 2023). On the other hand, for investors, rankings facilitate the allocation of resources to banks with sturdy financial foundations. The significance of standardized assessments of banks based on financial indicators extends beyond the borders of BiH. Globally, international organizations and regulatory bodies have developed frameworks and guidelines to promote sound banking practices and safeguard the interests of depositors and investors (Alam, Islam & Runy, 2021; Onyegbula, Nwoye & Daniel, 2023;

Shavshukov & Zhuravleva, 2023). These initiatives emphasize the importance of transparency, risk management, and prudential regulation.

To achieve a nuanced and comprehensive evaluation, MCDM methods come into play. These sophisticated techniques, including CRITIC (CRiteria Importance Through Intercriteria Correlation), TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution), MOORA (Multi-objective Optimization on the basis of Ratio Analysis), SDV (Standard DeViation), ARAS (Additive Ratio Assessment), and FAHP (Fuzzy Analytic Hierarchy Process), are adept at integrating diverse financial indicators. They provide a holistic perspective on bank performance and enable the assessment of trade-offs inherent in financial analysis.

Numerous empirical studies have significantly enriched the discourse in this field. Bătae et al. (2021) conducted a comprehensive examination of the relationship between Environmental, Social, and Governance (ESG) factors and the financial performance of European banks in the aftermath of the 2008 financial crisis. Their research accentuated the strategic importance of ESG policies, shedding light on their pivotal role in shaping the performance of banks. In a parallel endeavour, Petropoulos et al. (2020) employed advanced modelling techniques to predict insolvencies within U.S.-based financial institutions. The implications of their study extended to the realm of CAMELS (Capital Adequacy, Asset Quality, Management Quality, Earnings, Liquidity, and Sensitivity) evaluation metrics, illuminating how predictive models can enhance the risk assessment landscape within the banking sector.

Turning the spotlight onto the Indian private sector banking landscape, Sama, Kosuri & Kalvakolanu (2022) undertook a comprehensive evaluation. Employing a triad of analytical tools - CRITIC, TOPSIS, and GRA (Grey Relational Analysis) - they underscored the critical importance of performance augmentation in attracting potential investors. In a broader examination of the global banking landscape, Chenguel and Mansour (2022) embarked on a journey to trace the evolving contours of credit risk management within the banking domain. Their research offered a historical perspective, commencing from the Basel I framework and progressing through Basel III and IFRS 9. The study underscored the pivotal role of prudential regulations in mitigating credit risks and ensuring the stability of the banking system.

Shifting the lens to examine the intricacies of Corporate Social Responsibility (CSR) within the banking sector, Ruiz and García (2021) conducted an extensive inquiry. Their investigation unveiled notable measurement inconsistencies while also raising questions regarding the tangible impact of CSR initiatives on

bank reputation, particularly in the context of volatile financial climates. Meanwhile, Marjanović and Popović (2020) assumed the role of financial performance evaluators, embarking on an exploration of all banks operating within Serbia. Employing the CRITIC and TOPSIS methods, their study provided valuable insights for the decision-makers within the Serbian banking landscape, offering a comprehensive understanding of the sector's financial dynamics.

In an attempt to harmonize sustainability and business excellence, Markovic et al. (2020) introduced an innovative integrated model. This model, validated through the rigors of correlation coefficients and sensitivity analysis, offers a promising avenue for enhancing decision-making processes in pursuit of sustainable business practices. Zooming in on a recent case study, Spalević and Stanišić (2023) underscored the pivotal role of independent supervision within the context of effective banking regulation. In light of recent bank collapses within BiH, their research emphasizes the critical importance of regulatory measures in safeguarding the stability of the banking sector. On the Indian banking landscape, Sama, Kalvakolanu & Chakraborty (2021) revisited the evaluation of private sector banks, employing an array of sophisticated MCDM methods, including SDV, CRITIC, ARAS, and MOORA. Their findings underscore the critical role that MCDM methods play in the nuanced assessment and ranking of banking institutions.

Within the context of global financial turmoil, Nguyen, Tsai, Hu & Kumar (2021) engaged in a hybrid MCDM approach to assess the impact of COVID-19 on Vietnamese banks. Merging CRITIC, DEMATEL (Decision Making Trial and Evaluation Laboratory), and TOPSIS methods, their research pointed to the pressing need for accelerated digital transformation in the banking sector. It also demonstrated the applicability of this methodological fusion in addressing complex criteria problems that are of paramount concern to stakeholders. Taking a broader regional perspective, Wanke, Azad, Yazdi, Birau & Spulbar (2022) embarked on an exploration of the performance of banks within ASEAN (Association of Southeast Asian Nations) member countries. Their study incorporated Fuzzy TOPSIS and SWARA (Step-wise Weight Assessment Ratio Analysis) methods to address expert preference uncertainties. By introducing the concept of Z-numbers to manage the inherent fuzziness in banking performance, the research extended its purview to encompass the challenges of financial distress related to information reliability. Ultimately, their results underscored the effectiveness of information reliability methodologies within the CAMELS rating system proxy for addressing the impact of ASEAN banking performance on financial hardship. Meanwhile, Sindwani (2023) directed the spotlight towards the assessment of technology banking service quality (TBSQ) within major private sector banks.

By deploying the Fuzzy TOPSIS technique, the study aimed to identify quality factors necessitating attention, while simultaneously addressing service failures, cost-cutting measures, and the ultimate enhancement of bank productivity. Additionally, the application of the Fuzzy TOPSIS approach facilitated in-depth comparisons with industry competitors, thereby aiding managers in the formulation of strategies geared towards sustained competitive advantage.

Lastly, Mullor, Brotons & Sansalvador-Sellés (2020) introduced a pioneering bank ranking methodology grounded in the possibilistic theory. This methodological innovation sought to enhance result sensitivity by integrating techniques such as the FAHP and fuzzy TOPSIS. In doing so, their research compared results emanating from various distance measurements, thereby underscoring the paramount importance of diverse measures in guiding effective decision-making processes.

However, despite the advantages presented by the assessment and ranking of banks using MCDM methods, several challenges persist (Marqués, García & Sánchez, 2020). Data quality and availability can pose obstacles, particularly in emerging economies like BiH. Additionally, the dynamic nature of the financial industry necessitates ongoing refinement of assessment criteria and methodologies. Listed researchers and practitioners agree on the need for future studies to enhance the accuracy and relevance of these assessments, accounting for evolving market conditions and regulatory requirements.

Methodology and methods

The methodological framework implemented for the purposes of this research delineates the systematic progression followed to comprehensively analyse and evaluate the financial indicators of banks within this study. The following phases represent the structured sequence of steps within this framework:

Phase 1. Data Collection

Phase 2. Selection and Computation of Financial Indicators

Phase 3. Formation of the Initial Decision-Making Matrix

Phase 4. Computation of Weights for Financial Indicators

Phase 5. Ranking of banks

Phase 6. Execution of Sensitivity Analysis

The initial phase of this study involved the identification of banks operating within BiH. Leveraging data sourced from the website of the Central Bank of BiH, a comprehensive list of banks comprising a total of 21 institutions was compiled. Subsequently, each of these banks' websites was visited, and their financial reports for the year 2022 were acquired.

The subsequent stage entailed the selection of financial indicators pertinent to this research, which encompassed a total of five distinct categories (Table 1). The liquidity indicators scrutinize the ratio of cash and loans to deposits, elucidating the extent to which deposits held by individuals and legal entities in a bank are backed by cash or loans. It is worth noting that a higher coverage with cash rather than loans is preferable, as it offers greater security to depositors (Afzal, Mirza and Firdousi, 2023). Enhanced liquidity ensures that depositors can access their funds promptly. Additionally, fluctuations in deposit amounts may occur in response to changes in interest rates, which can either augment or diminish the volume of deposits (Lebedeva and Shkuropadska, 2023). Conversely, the volume of loans can fluctuate in response to shifts in interest rates; lower interest rates typically lead to increased loan demand, and vice versa. The financial structure indicators scrutinize positions on a bank's balance sheet, encompassing assets, liabilities, and capital, and offer insights into the bank's financing structure (Shemshad & Karim, 2023). These indicators assess the extent to which assets are covered by capital and vice versa, as well as the degree to which liabilities are offset by assets and capital (Kolozsi, Ladányi & Straubinger, 2022). Activity indicators juxtapose assets and profits with the number of employees, yielding metrics such as assets and profits per employee and the ratio of income to assets (Pušar Banović, 2022). These indicators consider the bank's size, accounting for variations in the number of employees and branches across banks (Zhukevych & Zhuk, 2023). Market activity indicators relate expenses to assets and income, yielding insights into the proportion of costs within the bank's total assets and business income (Chaudhuri, Mitra, Guha, Biswas & Kumar, 2023). This illuminates the extent to which business expenses are offset by business income, with banks aiming to generate total revenues exceeding their costs and realizing profitability in their operations (Wang, Xiuping & Zhang, 2021; Khan 2022). Lastly, profitability indicators, widely employed in practice, establish the relationship between profit and assets (Kushnir, Kovshun, Adamchuk, Tymeichuk & Tsaruk, 2023), capital, and operating income (Mohsin et al., 2021). These indicators serve as crucial tools for assessing the financial health of banks, with a particular focus on their profitability (Alamoudi & Bafail, 2022).

Following the selection of financial indicators, the requisite data for their calculation were extracted from the financial reports of the respective banks. The methodology for computing these financial indicators is delineated in Table 1.

Table 1: Financial indicators and computing method

Id	Financial indicators	Numerator	Denominator
C1	Liquidity indicators		
C11	Share of Cash in Deposits	Cash and Cash Equivalents	Deposits
C12	Share of Loans in Deposits	Loans	Deposits
C2	Financial structure indicators		
C21	Equity Multiplier	Total Assets	Capital
C22	Financial Leverage	Capital	Total Assets
C23	Debt-to-Asset Ratio	Total Liabilities	Total Assets
C24	Debt-to-Equity Ratio	Total Liabilities	Capital
C3	Activity indicators		
C31	Assets per Employee	Total Assets	Number of Employees
C32	Gross Profit per Employee	Pre-tax Profit	Number of Employees
C33	Total Asset Turnover	Operating Revenues	Total Assets
C4	Market activity indicators		
C41	Cost-to-Asset Ratio	Operating Costs	Total Assets
C42	Cost-to-Net Income Ratio	Operating Costs	Operating Revenues
C5	Profitability indicators		
C51	Return on Assets (ROA)	Pre-tax Profit	Total Assets
C52	Return on Equity (ROE)	After-tax Profit	Capital
C53	Gross Profit Margin	Pre-tax Profit	Operating Revenues

Source: Pušar Banović, 2022, pp. 231-233.

The third phase of this research entails the creation of the initial decision-making matrix, which serves as the foundational framework for the application of MCDM methods. The matrix is constructed in a manner that involves the selection of criteria and alternatives, followed by the assessment of alternatives against these criteria (Stević, Subotić, Softić & Božić, 2022). In the context of this study, the criteria encompass financial indicators, while the alternatives pertain to banks operating within BiH. The computed financial indicators are integrated into the initial decision-making matrix, which subsequently serves as the basis for the MEREC and MARCOS methods.

In the fourth phase, the determination of the importance attributed to the financial indicators is ascertained through the calculation of criteria weights, with the

MEREC method serving as the mechanism for this computation. The MEREC method, introduced by Keshavarz-Ghorabae, Amiri, Zavadskas, Turskis & Antucheviciene (2021), falls within the category of objective weight calculation methods. It derives weights based on the values that the alternatives exhibit concerning the employed criteria. The methodology comprises the following procedural steps:

Step 1. Formation of the initial decision matrix.

Step 2. Normalization of the initial decision matrix. This method employs cost normalization, where all values are converted into minimum values (Puška et al., 2023). Given that higher values are preferable for the indicators, they are considered as benefit criteria and normalized accordingly as follows:

$$n_{ij} = \frac{x_{j \min}}{x_{ij}} \quad (1)$$

where $x_{j \min}$ represents the minimum value among alternatives for a specific criterion.

Step 3. Computation of the overall performance scores for the alternatives (S_i). In this step, the absolute values of the normalized data are first calculated, then summed across all alternatives, divided by the number of criteria, incremented by one, and finally subjected to natural logarithm:

$$S_i = \ln \left(1 + \left(\frac{1}{m} \sum_j |\ln(n_{ij}^x)| \right) \right) \quad (2)$$

Step 4. Calculation of the impacts of alternatives for each criterion. This process is akin to the previous one, with the exception that the criterion for which this value is calculated is excluded from the analysis:

$$S'_{ij} = \ln \left(1 + \left(\frac{1}{m} \sum_{k, k \neq j} |\ln(n_{ik}^x)| \right) \right) \quad (3)$$

Step 5. Determination of the sum of deviations from absolute values. In this phase, the disparity between the values of the overall performance scores of the alternatives and the impacts of the alternatives is computed:

$$E_j = \sum_i |S'_{ij} - S_i| \quad (4)$$

Step 6. Computation of the final criteria weights.

$$w_j = \frac{E_j}{\sum_k E_k} \quad (5)$$

The fifth phase of this study involves the ranking of banks, a process that will be facilitated by the MARCOS method. This particular method is tailored for the ranking of alternatives with respect to ideal and anti-ideal solutions, as detailed by Mijajlović et al. (2020). In this context, the ideal solution signifies the highest values attained by alternatives for individual criteria, whereas the anti-ideal solution corresponds to the lowest values achieved by alternatives for individual criteria (Tešić, Božanić, Puška, Milić & Marinković, 2023). The MARCOS method is characterized by the following procedural steps (Stević, Pamučar, Puška & Chatterjee, 2020):

Step 1. Formation of the initial decision matrix.

Step 2. Expansion of the initial decision matrix. This expansion is achieved by introducing ideal and anti-ideal solutions.

Step 3. Normalization of the extended initial decision matrix. For the same rationale as employed in the MEREC method, normalization takes the form:

$$n_{ij} = \frac{x_{ij}}{x_{j \max}} \quad (6)$$

where $x_{j \max}$ denotes the maximum value of the criterion.

Step 4. Decision matrix weighting. In this step, the normalized decision matrix is multiplied by the corresponding weights acquired through the MEREC method:

$$v_{ij} = n_{ij} \cdot w_j \quad (7)$$

Step 5. Computation of the utility degree each alternative. The utility degree is determined based on ideal and anti-ideal solutions:

$$K_i^- = \frac{S_i}{S_{aai}} \quad (8)$$

$$K_i^+ = \frac{S_i}{S_{ai}} \quad (9)$$

$$S_i = \sum_{j=1}^n v_{ij} \quad (10)$$

Where $(i = 1, 2, \dots, m)$ represents the elements of the weighted decision matrix.

Step 6. Forming the utility function of alternatives denotes as $f(K_i)$.

$$f(K_i) = \frac{K_i^+ + K_i^-}{1 + \frac{1 - f(K_i^+)}{f(K_i^+)} + \frac{1 - f(K_i^-)}{f(K_i^-)}} \quad (11)$$

where $f(K_i^-)$ represents the utility function concerning the anti-ideal solution, and $f(K_i^+)$ is the utility function concerning the ideal solution. These are calculated using the following expressions:

$$f(K_i^-) = \frac{K_i^+}{K_i^+ + K_i^-} \quad (12)$$

$$f(K_i^+) = \frac{K_i^-}{K_i^+ + K_i^-} \quad (13)$$

Step 7. The alternatives undergo a ranking process, which hinges on the resultant values derived from the MARCOS method. The superior alternative is characterized by the highest value, while the inferior alternative corresponds to the lowest value, as determined by the MARCOS method.

The conclusive phase of this research encompasses the execution of a sensitivity analysis. The primary objective of the sensitivity analysis is to quantify the extent of influence wielded by individual criteria on the final ranking (Stojanović, Puška & Selaković, 2022). This analysis can be conducted via diverse approaches. In this research, the scenarios were structured as follows: each individual criterion undergoes a 20% reduction, culminating in the ultimate scenario where the ranking is established entirely without the involvement of that specific criterion, thus nullifying its impact on the ranking of the alternatives. The other criteria remain unaltered. This approach results in the creation of a total of 70 scenarios, given the presence of 14 financial indicators, each subjected to reduction on five separate occasions.

Results

Prior to calculating importance of financial indicators and ranking banks, it is necessary to form an initial decision-making matrix. The initial decision-making matrix takes shape through the computation of financial indicators for the observed banks (Table 2), utilizing the methodology delineated in Table 1. It is discernible from this initial decision matrix (Table 2) that the outcomes extracted from the financial statements exhibit substantial divergence, necessitating a harmonization process. To address this variance, normalization is employed. Hereafter, these banks shall be denominated as Bank1 through to Bank21 for reference within the text.

Table 2: Initial decision matrix

Banks	C11	C12	C21	C22	C23	C24	C31	C32	C33	C41	C42	C51	C52	C53
Addiko bank Banja Luka	0.31	0.80	6.03	0.17	0.83	5.03	2804.47	41.76	0.05	0.03	0.64	0.01	0.08	0.27
Addiko bank Sarajevo	0.32	0.62	5.86	0.17	0.83	4.86	2854.80	42.95	0.06	0.03	0.49	0.02	0.08	0.23
ASA bank	0.33	0.67	8.32	0.12	0.88	7.32	4198.61	31.16	0.02	0.01	0.52	0.01	0.06	0.37
Atos bank	0.28	0.76	6.89	0.15	0.85	5.89	2805.68	29.63	0.05	0.03	0.65	0.01	0.07	0.19
BBI bank	0.31	0.69	8.95	0.11	0.89	7.95	3640.63	40.92	0.03	0.02	0.67	0.01	0.09	0.34
„Banka Poštanska štedionica“	0.26	0.76	8.94	0.11	0.89	7.94	3049.44	12.21	0.04	0.01	0.26	0.00	0.04	0.11
Intesa Sanpaolo bank	0.32	0.84	7.66	0.13	0.87	6.66	4710.76	48.03	0.04	0.02	0.51	0.01	0.07	0.21
KIB bank	0.37	0.56	4.13	0.24	0.76	3.13	1557.33	21.91	0.05	0.04	0.72	0.01	0.04	0.19
MF bank	0.26	0.93	7.99	0.13	0.87	6.99	2437.40	43.80	0.07	0.05	0.66	0.02	0.13	0.22
„Naša banka“	0.35	0.69	11.06	0.09	0.91	10.06	1540.99	8.33	0.06	0.05	0.83	0.01	0.06	0.09
NLB bank Banja Luka	0.20	0.71	9.99	0.10	0.90	8.99	3941.39	82.46	0.04	0.02	0.45	0.02	0.19	0.50
NLB bank Sarajevo	0.22	0.81	9.60	0.10	0.90	8.60	3442.01	66.23	0.04	0.02	0.61	0.02	0.13	0.36
„Nova banka“	0.24	0.70	11.11	0.09	0.91	10.11	4178.25	60.86	0.05	0.03	0.62	0.01	0.15	0.26
„Privredna banka“	0.77	0.52	8.57	0.12	0.77	6.58	2757.72	33.60	0.01	0.03	2.62	0.01	0.09	0.82
ProCredit bank	0.40	0.81	11.76	0.09	0.91	10.76	5127.35	46.28	0.03	0.02	0.65	0.01	0.10	0.25
Raiffeisen bank	4.18	8.06	8.06	0.12	0.88	7.06	3747.19	79.95	0.02	0.03	1.24	0.02	0.16	0.94
Sparkasse bank	0.19	0.76	8.03	0.12	0.88	7.03	4209.26	55.66	0.05	0.01	0.29	0.01	0.10	0.26
UniCredit bank Banja Luka	0.25	0.78	5.10	0.20	0.80	4.10	3403.11	60.82	0.05	0.03	0.57	0.02	0.08	0.35
UniCredit bank Mostar	0.18	0.74	8.45	0.12	0.88	7.45	5534.68	106.74	0.04	0.02	0.43	0.02	0.15	0.40
Union bank	0.25	0.47	8.75	0.11	0.89	7.75	5287.69	7.38	0.02	0.02	0.97	0.00	0.01	0.06
Ziraat bank	0.27	0.85	10.57	0.09	0.91	9.57	3837.45	26.10	0.05	0.04	0.69	0.01	0.07	0.13

Source: Authors

Following the establishment of the initial decision matrix, the MEREC method proceeds with its sequential steps. Initially, the normalized decision matrix is computed. In this phase, the minimum value among all alternatives for each criterion is ascertained, and subsequently, these values are divided by the corresponding values of the alternatives for the specific criteria. For instance, for Bank1 and criterion C11, the normalization is computed as follows: $n_{11} = \frac{17.7429}{30.5984} = 0.58$, and for Bank4 and criterion C22, the normalization is determined as follows: $n_{44} = \frac{8.5035}{14.5067} = 0.59$. In the same manner, computations are performed for all other indicators across all alternatives, adhering to the respective criteria (Table 3).

Table 3: Normalized decision matrix of the MEREC method

Banks	C11	C12	C21	C22	C23	C24	C31	C32	C33	C41	C42	C51	C52	C53
Bank1	0.58	0.59	0.69	0.51	0.91	0.62	0.55	0.18	0.27	0.30	0.41	0.09	0.14	0.24
Bank2	0.55	0.77	0.70	0.50	0.91	0.64	0.54	0.17	0.22	0.31	0.53	0.09	0.13	0.27
Bank3	0.53	0.71	0.50	0.71	0.86	0.43	0.37	0.24	0.74	1.00	0.50	0.19	0.20	0.17
Bank4	0.63	0.62	0.60	0.59	0.89	0.53	0.55	0.25	0.27	0.29	0.40	0.13	0.17	0.33
Bank5	0.56	0.68	0.46	0.76	0.85	0.39	0.42	0.18	0.45	0.47	0.39	0.12	0.12	0.19
Bank6	0.70	0.62	0.46	0.76	0.85	0.39	0.51	0.60	0.37	0.99	1.00	0.35	0.31	0.57
Bank7	0.56	0.56	0.54	0.65	0.87	0.47	0.33	0.15	0.32	0.43	0.51	0.14	0.16	0.30
Bank8	0.48	0.85	1.00	0.35	1.00	1.00	0.99	0.34	0.26	0.25	0.36	0.10	0.27	0.33
Bank9	0.69	0.51	0.52	0.68	0.87	0.45	0.63	0.17	0.18	0.19	0.39	0.08	0.09	0.29
Bank10	0.51	0.69	0.37	0.94	0.83	0.31	1.00	0.89	0.23	0.19	0.31	0.26	0.20	0.74
Bank11	0.89	0.67	0.41	0.85	0.84	0.35	0.39	0.09	0.34	0.53	0.58	0.07	0.06	0.13
Bank12	0.81	0.59	0.43	0.82	0.85	0.36	0.45	0.11	0.35	0.40	0.42	0.07	0.09	0.18
Bank13	0.73	0.68	0.37	0.94	0.83	0.31	0.37	0.12	0.25	0.28	0.42	0.10	0.07	0.25
Bank14	0.23	0.91	0.48	0.73	0.99	0.48	0.56	0.22	1.00	0.27	0.10	0.11	0.12	0.08
Bank15	0.44	0.58	0.35	1.00	0.83	0.29	0.30	0.16	0.41	0.44	0.40	0.15	0.12	0.26
Bank16	0.04	0.06	0.51	0.69	0.87	0.44	0.41	0.09	0.62	0.35	0.21	0.07	0.07	0.07
Bank17	0.95	0.63	0.51	0.68	0.87	0.45	0.37	0.13	0.28	0.68	0.90	0.11	0.11	0.25
Bank18	0.70	0.61	0.81	0.43	0.94	0.76	0.45	0.12	0.28	0.35	0.46	0.08	0.13	0.18
Bank19	1.00	0.64	0.49	0.72	0.86	0.42	0.28	0.07	0.31	0.51	0.61	0.07	0.08	0.16
Bank20	0.70	1.00	0.47	0.74	0.86	0.40	0.29	1.00	0.67	0.48	0.27	1.00	1.00	1.00
Bank21	0.66	0.56	0.39	0.90	0.84	0.33	0.40	0.28	0.26	0.26	0.37	0.21	0.16	0.49

Source: Authors

The subsequent phase entails the computation of the overall performance scores for the alternatives, as elucidated in Table 4. These normalized values extracted from the decision matrix are subjected to natural logarithm transformation, and their absolute values are determined. Subsequently, the values obtained for each specific criterion across all banks are cumulatively summated. This resultant value is divided by the number of criteria, specifically 14 in this instance, and augmented by one (1). Finally, the natural logarithm is computed based on this derived value. The procedure for ascertaining the impacts of alternatives is analogous, albeit unique to each criterion under consideration. Consequently, while a single value is derived for overall performance, as many values as there are criteria are generated for alternative impacts, as illustrated in Table 4.

Table 4: Overall performance and alternative impacts

Banks	S'_{ij}														
	S_i	C11	C12	C21	C22	C23	C24	C31	C32	C33	C41	C42	C51	C52	C53
Bank1	0.70	0.68	0.68	0.69	0.68	0.70	0.68	0.68	0.64	0.65	0.66	0.67	0.61	0.63	0.65
Bank2	0.69	0.67	0.68	0.67	0.66	0.68	0.67	0.66	0.62	0.63	0.64	0.66	0.60	0.61	0.64
Bank3	0.60	0.58	0.59	0.57	0.59	0.59	0.57	0.56	0.54	0.59	0.60	0.57	0.53	0.53	0.53
Bank4	0.66	0.64	0.64	0.64	0.64	0.66	0.64	0.64	0.61	0.61	0.61	0.63	0.58	0.59	0.62
Bank5	0.69	0.67	0.68	0.67	0.68	0.69	0.66	0.66	0.63	0.66	0.67	0.66	0.62	0.62	0.63
Bank6	0.45	0.43	0.43	0.41	0.44	0.44	0.41	0.42	0.43	0.40	0.45	0.45	0.40	0.39	0.42
Bank7	0.68	0.66	0.66	0.66	0.67	0.68	0.66	0.64	0.61	0.64	0.65	0.66	0.61	0.62	0.64
Bank8	0.60	0.57	0.59	0.60	0.56	0.60	0.60	0.60	0.56	0.55	0.54	0.56	0.50	0.55	0.55
Bank9	0.75	0.74	0.73	0.73	0.74	0.75	0.73	0.74	0.69	0.70	0.70	0.72	0.67	0.67	0.71
Bank10	0.58	0.56	0.57	0.54	0.58	0.58	0.54	0.58	0.58	0.52	0.52	0.54	0.53	0.52	0.57
Bank11	0.76	0.76	0.75	0.73	0.76	0.76	0.73	0.73	0.68	0.73	0.74	0.74	0.67	0.66	0.69
Bank12	0.75	0.74	0.73	0.72	0.74	0.74	0.71	0.72	0.67	0.71	0.72	0.72	0.66	0.66	0.69
Bank13	0.77	0.75	0.75	0.73	0.76	0.76	0.73	0.73	0.69	0.72	0.72	0.74	0.68	0.67	0.72
Bank14	0.76	0.71	0.76	0.74	0.75	0.76	0.74	0.74	0.71	0.76	0.72	0.68	0.69	0.69	0.67
Bank15	0.72	0.70	0.71	0.69	0.72	0.72	0.68	0.68	0.66	0.69	0.70	0.69	0.66	0.65	0.68
Bank16	0.96	0.87	0.88	0.94	0.95	0.95	0.93	0.93	0.89	0.94	0.93	0.91	0.88	0.88	0.88
Bank17	0.66	0.66	0.64	0.64	0.65	0.66	0.63	0.62	0.58	0.61	0.65	0.66	0.58	0.58	0.61
Bank18	0.71	0.70	0.69	0.70	0.68	0.71	0.70	0.68	0.63	0.66	0.67	0.68	0.62	0.64	0.65
Bank19	0.76	0.76	0.74	0.73	0.75	0.75	0.73	0.71	0.66	0.72	0.73	0.74	0.67	0.67	0.69
Bank20	0.36	0.35	0.36	0.33	0.35	0.36	0.32	0.30	0.36	0.34	0.33	0.30	0.36	0.36	0.36
Bank21	0.67	0.65	0.65	0.63	0.66	0.66	0.63	0.63	0.62	0.62	0.62	0.63	0.61	0.60	0.64

Source: Authors

Subsequently, the absolute deviations between the performance of the alternatives and the impacts of the alternatives are computed. As an illustration, for Bank1 concerning Criterion C11, this calculation appears as follows: $E_{11} = |0.70 - 0.68| = 0.02$. This process is executed for all banks and across all criteria. These values are subsequently aggregated by criteria, culminating in the summative value, denoted as (E_j), representing the cumulative deviation from the absolute values for each criterion. Ultimately, the summation of all these E_j values is ascertained, whereby the individual values (E_j) are divided by this summation, yielding the ultimate criterion weights. For example, in the case of Criterion C11, the calculation unfolds as follows: $w_{C11} = \frac{0.451}{10.577} = 0.043$. This computation methodology is consistently applied to all other criteria, ultimately yielding the

conclusive criterion weight values that signify the relative importance of these criteria.

The resultant outcomes unveil that Criterion C51 attains the highest weight, closely followed by C52, while Criterion C23 garners the least weight. Notably, the discrepancy between the weights of C51 and C23 is substantial, with Criterion C51 carrying 15 times more weight than Criterion C23 (Table 5). The rationale underlying this discrepancy can likely be traced to the values of the financial indicators. Specifically, the most significant disparities in values occur within Criterion C51, whereas Criterion C23 exhibits the smallest variability in values across the banks.

Table 5: Value of criteria weights

	C11	C12	C21	C22	C23	C24	C31	C32	C33	C41	C42	C51	C52	C53
E_j	0.451	0.379	0.524	0.287	0.102	0.629	0.613	1.220	0.824	0.732	0.683	1.583	1.509	1.042
w_j	0.043	0.036	0.050	0.027	0.010	0.059	0.058	0.115	0.078	0.069	0.065	0.150	0.143	0.099

Source: Authors

Following the computation of criteria weights, the ranking of banks is executed based on the financial indicator values, employing the MARCOS method. Subsequent to the formation of the initial decision-making matrix, the matrix is expanded to incorporate ideal and anti-ideal solutions. This augmentation is succeeded by the normalization of data. Distinct from the MEREC method, the MARCOS method involves the computation of values for benefit criteria (Table 6). It is noteworthy that the ideal solution (IA) holds a constant value of one (1) for all criteria, signifying the highest criterion value across each alternative. Conversely, the value of the anti-ideal solution (AIA) varies contingent upon the specific criterion.

Table 6: Normalization of the decision matrix for the purposes of the MARCOS method

	C11	C12	C21	C22	C23	C24	C31	C32	C33	C41	C42	C51	C52	C53
AIA	0.04	0.06	0.35	0.35	0.83	0.29	0.28	0.07	0.18	0.19	0.10	0.07	0.06	0.07
Bank1	0.07	0.10	0.51	0.69	0.91	0.47	0.51	0.39	0.67	0.65	0.24	0.70	0.41	0.29
Bank2	0.08	0.08	0.50	0.70	0.91	0.45	0.52	0.40	0.84	0.62	0.19	0.71	0.43	0.25
Bank3	0.08	0.08	0.71	0.50	0.96	0.68	0.76	0.29	0.25	0.19	0.20	0.35	0.29	0.40
Bank4	0.07	0.09	0.59	0.60	0.93	0.55	0.51	0.28	0.69	0.67	0.25	0.49	0.34	0.20
Bank5	0.08	0.09	0.76	0.46	0.97	0.74	0.66	0.38	0.41	0.41	0.25	0.53	0.47	0.36
Bank6	0.06	0.09	0.76	0.46	0.97	0.74	0.55	0.11	0.50	0.19	0.10	0.19	0.19	0.12
Bank7	0.08	0.10	0.65	0.54	0.95	0.62	0.85	0.45	0.58	0.45	0.20	0.48	0.35	0.22
Bank8	0.09	0.07	0.35	1.00	0.83	0.29	0.28	0.21	0.70	0.76	0.28	0.66	0.21	0.21
Bank9	0.06	0.11	0.68	0.52	0.96	0.65	0.44	0.41	1.00	1.00	0.25	0.84	0.66	0.23
Bank10	0.08	0.08	0.94	0.37	0.99	0.94	0.28	0.08	0.80	1.00	0.31	0.25	0.29	0.09
Bank11	0.05	0.09	0.85	0.41	0.98	0.84	0.71	0.77	0.53	0.36	0.17	0.98	1.00	0.53
Bank12	0.05	0.10	0.82	0.43	0.98	0.80	0.62	0.62	0.52	0.48	0.23	0.90	0.68	0.38
Bank13	0.06	0.09	0.94	0.37	0.99	0.94	0.75	0.57	0.73	0.68	0.24	0.68	0.80	0.28
Bank14	0.18	0.06	0.73	0.48	0.84	0.61	0.50	0.31	0.18	0.72	1.00	0.57	0.49	0.87
Bank15	0.10	0.10	1.00	0.35	1.00	1.00	0.93	0.43	0.45	0.44	0.25	0.42	0.50	0.27
Bank16	1.00	1.00	0.69	0.51	0.96	0.66	0.68	0.75	0.29	0.55	0.47	1.00	0.84	1.00
Bank17	0.04	0.09	0.68	0.51	0.96	0.65	0.76	0.52	0.66	0.28	0.11	0.62	0.51	0.27
Bank18	0.06	0.10	0.43	0.81	0.88	0.38	0.61	0.57	0.65	0.55	0.22	0.84	0.43	0.37
Bank19	0.04	0.09	0.72	0.49	0.96	0.69	1.00	1.00	0.59	0.38	0.16	0.90	0.76	0.43
Bank20	0.06	0.06	0.74	0.47	0.97	0.72	0.96	0.07	0.27	0.40	0.37	0.07	0.06	0.07
Bank21	0.06	0.11	0.90	0.39	0.99	0.89	0.69	0.24	0.70	0.74	0.26	0.32	0.37	0.14
IA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Source: Authors

Subsequently, this normalized decision matrix undergoes a multiplication process by the weight values associated with each criterion, yielding a weighted decision matrix. Subsequent to this calculation, the values are summated for each bank, and the utility degree is computed for all alternatives concerning both the anti-ideal solution (K_i^-), and the ideal solution (K_i^+) (Table 7). This calculation is exemplified with Bank1 as follows: $K_1^- = \frac{0.466}{0.139} = 3.353$; $K_1^+ = \frac{0.466}{1.000} = 0.466$. The utility degrees for all banks are determined using the same methodology.

The subsequent step entails the computation of utility functions in relation to the ideal $f(K_i^+)$ and anti-ideal $f(K_i^-)$ solutions. For Bank 1, this calculation appears as follows: $f(K_1^-) = \frac{0.466}{0.466+3.353} = 0.122$ and $f(K_1^+) = \frac{3.353}{0.466+3.353} = 0.878$. These values

are similarly computed for all banks. Following the establishment of the utility degree and utility functions, the MARCOS method value is ascertained. In the case of Bank 1, the final MARCOS method value is determined as follows:

$$f(K_1) = \frac{0.466+3.353}{1+\frac{1-0.878}{0.878}+\frac{1-0.122}{0.122}} = 0.458$$
 The MARCOS method values for all banks are computed in a similar fashion.

The outcomes derived from the MARCOS method reveal that Raiffeisen bank secures the highest ranking, followed by NLB bank Banja Luka, whereas Union bank exhibits the least favorable indicators. Predicated on these results, clients' primary choice would be Raiffeisen bank, given its superior financial indicators and improved operational performance relative to other banks, thereby instilling a certain level of confidence among clients.

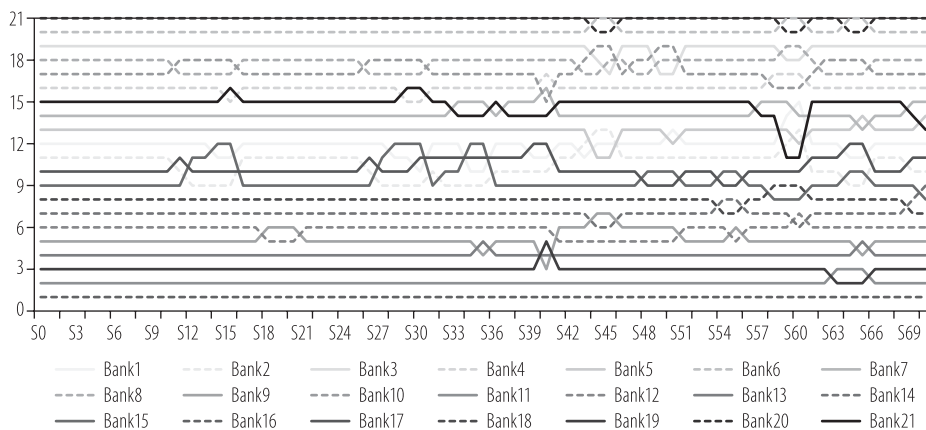
Table 7: Ranking of banks using the MARCOS method

	S_i	K_i^-	K_i^+	$f(K_i^-)$	$f(K_i^+)$	$f(K_i)$	Rank
AIA	0.139						
Bank1	0.466	3.353	0.466	0.122	0.878	0.458	12
Bank2	0.474	3.409	0.474	0.122	0.878	0.466	11
Bank3	0.361	2.596	0.361	0.122	0.878	0.355	19
Bank4	0.413	2.973	0.413	0.122	0.878	0.406	16
Bank5	0.450	3.237	0.450	0.122	0.878	0.442	13
Bank6	0.280	2.013	0.280	0.122	0.878	0.275	20
Bank7	0.434	3.123	0.434	0.122	0.878	0.427	14
Bank8	0.390	2.807	0.390	0.122	0.878	0.384	18
Bank9	0.582	4.186	0.582	0.122	0.878	0.572	5
Bank10	0.394	2.837	0.394	0.122	0.878	0.388	17
Bank11	0.667	4.798	0.667	0.122	0.878	0.656	2
Bank12	0.581	4.179	0.581	0.122	0.878	0.571	6
Bank13	0.599	4.310	0.599	0.122	0.878	0.589	4
Bank14	0.539	3.877	0.539	0.122	0.878	0.530	7
Bank15	0.482	3.464	0.482	0.122	0.878	0.473	9
Bank16	0.761	5.472	0.761	0.122	0.878	0.748	1
Bank17	0.475	3.421	0.475	0.122	0.878	0.468	10
Bank18	0.508	3.656	0.508	0.122	0.878	0.500	8
Bank19	0.646	4.651	0.646	0.122	0.878	0.636	3
Bank20	0.268	1.925	0.268	0.122	0.878	0.263	21
Bank21	0.429	3.084	0.429	0.122	0.878	0.422	15
IA	1.000						

Source: Authors

To gauge the extent of the influence of financial indicators on banks' rankings, a sensitivity analysis will be undertaken (Božanić, Pamučar & Bojanić, 2015; Jokić, Božanić & Pamučar, 2021). As previously detailed in the methodology section, each observed financial indicator will be systematically reduced by 20% until its value reaches zero (0). This approach results in the creation of 70 distinct scenarios. The results of the sensitivity analysis (Figure 1) reveal that only Raiffeisen bank maintains an unaltered ranking across all of these scenarios, thereby affirming its superior financial indicators in comparison to other banks. NLB bank Banja Luka secures the third position in the ranking list in three scenarios, specifically those linked to the financial indicator C52. As the importance of this indicator diminishes, this bank occupies the third rank. This outcome is attributed to the fact that NLB bank Banja Luka demonstrates superior results in this financial indicator in contrast to UniCredit bank Mostar. Consequently, the reduction in the weight of this criterion brings about a shift in the ranking of these banks. The same principles apply to the remaining banks, wherein alterations in ranking correspond to variations in specific financial indicators. A bank's advancement in the ranking stems from its comparatively weaker performance in a particular financial indicator relative to another bank, and conversely. In light of this sensitivity analysis, it becomes imperative for each bank to identify the pivotal financial indicators that exert an impact on its ranking. Subsequently, proactive measures must be taken to enhance these indicators (Đukić, Petrović, Božanić & Delibašić, 2023), thus rendering the bank more appealing to end-users.

Figure 1: Results of the sensitivity analysis



Source: Authors

Discussion

The banking sector plays a pivotal role in a country's development. Nonetheless, the advancement of the banking sector should be in tandem with the progress of other industries within the nation (Topić-Pavković et al., 2023). Banks, while indispensable, do not independently propel a nation's development; instead, their function is to facilitate the seamless flow of financial resources. In response to technological advancements, banks have expanded their digital service offerings, catering to both the populace and business entities (Oliynyk, 2023). Furthermore, there has been a convergence of various services provided by banks (Ahmić and Išović, 2023). Consequently, the selection of a bank for conducting business has become increasingly intricate. This choice is influenced by a multitude of factors. As presented, this paper introduced a methodology for bank selection based on financial indicators, recognized as pivotal in elucidating the performance of these institutions (Wanke et al., 2019).

To ensure a comprehensive financial analysis, a diverse array of financial indicators has been meticulously chosen and categorized into five distinct groups. Each of these groups is further subdivided into specific indicators. These indicators have been applied across all banks in BiH mandated to publicly disclose their financial reports. When scrutinizing liquidity indicators, it becomes evident that Raiffeisen bank boasts indicators significantly outperforming those of other banks. This exceptional performance can be attributed to the bank's substantial holdings in money and cash equivalents, surpassing those of its counterparts, thereby yielding superior liquidity metrics. Upon examining the financial structure indicators, it is apparent that not a solitary bank stands apart from the rest, but rather a group of banks exhibit variations that, while discernible, do not reach the magnitude observed in liquidity indicators. Within this realm, different banks excel in specific metrics. ProCredit Bank emerges as the leader in the C21 indicator, signifying the best asset-to-capital ratio. Conversely, when applying the inverse of this ratio (C22), KIB bank boasts the most favourable metrics. However, it should be noted that these two ratios employ the same underlying values, prompting inquiry into the relative importance of the equity multiplier versus financial leverage that warrants exploration in future research. In terms of the remaining two indicators within the financial structure category, ProCredit Bank delivers commendable results, signifying its superior financial structure indicators.

In contrast to other metrics, activity indicators incorporate considerations regarding the number of employees within these banks. Consequently, measurements such as assets and gross profit per employee have been calculated. Notably,

UniCredit bank Mostar exhibits superior performance in these two indicators that account for employee numbers, while MF bank excels in the turnover of total assets. The subsequent indicator under scrutiny pertains to market efficiency. To assess this indicator, parameters of operating costs were scrutinized and aligned with assets and income. Naša banka emerges with the most favourable results for the cost-to-asset ratio, whereas Privredna banka boasts the most commendable outcomes for the cost-to-income ratio. The final set of indicators examined pertains to profitability indicators. According to some scholars, these indicators hold paramount importance in financial analysis (Mohsin et al., 2021). The analysis reveals that Raiffeisen bank leads in the ROA indicator, whereas NLB bank Banja Luka takes the lead in the ROE and gross profit margin indicators.

It is evident from this in-depth analysis of financial indicators that no single bank emerges as the best across all metrics; different banks excel in distinct areas. Consequently, the decision regarding bank selection necessitates a trade-off between these diverse indicators. To facilitate this, the application of multi-criteria analysis becomes imperative. In employing MCDM methods, the first crucial step involves determining the importance attributed to the observed criteria. This is accomplished through the calculation of criteria weights. In this study, the MEREC method was employed for calculating these weights. Diverging from other methods, the MEREC method performs normalization by transforming all criteria into cost criteria (Narang, Kumar & Dhawan, 2023). However, some scholars have also explored the use of benefit normalization with this method to compare its outcomes with other methods (Puška et al., 2022). The research findings indicate that the MEREC method aligns reasonably well with other methods, hence its adoption in this study. This paper employs cost normalization, consistent with the approach adopted in the original paper by Keshavarz-Ghorabae et al. (2021). This method, in tandem with other methods for objectively calculating criterion weights, evaluates the value of alternatives with respect to specific criteria. A wider dispersion of data within a given criterion signifies its greater importance, and vice versa. It should be underscored that all indicators were collectively assessed, with each indicator holding equal potential to influence the bank ranking. However, the results of the MEREC method reveal variances in the weight and importance assigned to these criteria. Consequently, criterion C51 received the highest weight and exerted a more substantial influence on the final ranking compared to other financial indicators employed as criteria. By incorporating these weights alongside the MARCOS method, the ranking of banks was determined. The MARCOS method was devised to consider all calculated financial indicators, shaping the ranking order based on a compromise between these indicator values. Raiffeisen bank secured the top position in the final ranking, showcasing superior performance compared to its counterparts.

However, to make a well-informed decision, it is vital to consider other specificities of the banking sector. Therefore, various financial indicators were taken into account to enhance the comprehensiveness of this banking analysis. A sensitivity analysis demonstrated that despite variations in the weights of individual criteria, this bank consistently ranked as the best across all 70 scenarios.

The outcomes of this research can be valuable for both banks and potential clients. Banks can evaluate their current standing in comparison to competitors and enact measures to secure a higher ranking. Based on this research, potential clients can place greater trust in the operations of particular banks and make informed decisions about whether to remain clients or switch banks. However, it is important to note that this research exclusively relies on financial indicators, and the final decision should encompass other factors to ensure clients' utmost confidence in their choice.

Conclusion

The analysis of the financial sector, particularly the banking segment, holds significant importance in gaining insights into its current status. The analyses conducted in this research serve as a means to enhance the performance of individual banks and subsequently bolster the confidence and security of clients within these institutions. Financial indicators serve as potent tools for assessing the operational efficacy of various business entities, underscoring their paramount relevance in this study.

To assess the prevailing conditions within the banking sector of BiH, the following analytical processes were conducted. Initially, a selection of key financial indicators was computed for all banks, followed by the utilization of the MEREC and MARCOS methodologies to rank these banks. The findings of the MEREC method underscored the substantial discrepancy in the significance of certain criteria in comparison to others, with specific financial indicators wielding an influence fifteen times greater than their counterparts. Consequently, the weights assigned through the MCDM approach played a pivotal role in determining the impact of each financial indicator on the final decision. The application of the MARCOS method facilitated the ranking of these banks, revealing that Raiffeisen bank emerged as the most successful in fulfilling the research objectives and achieving the best overall results across all financial indicators. However, it is imperative to emphasize that a bank ranking as the lowest in surveys of this nature does not necessarily imply that it should cease operations. Instead, it signifies that the bank in question possesses comparatively weaker results in com-

prehensive financial indicators and should take proactive measures to enhance these metrics, ultimately improving its overall performance.

While this research offers valuable contributions, it is not without its limitations, which should be addressed in future studies. One such limitation lies in the selection of financial indicators, as there exists a plethora of potential metrics. Future research endeavours could benefit from expert opinions to determine the relative importance of these indicators, thereby enhancing the selection process. Such an approach may yield a different bank ranking; however, the sensitivity analysis conducted herein demonstrated that Raiffeisen bank remains robust in the face of changing weights assigned to financial indicators, consistently maintaining its top ranking. Furthermore, this research solely focused on financial indicators, constituting another limitation. To render the decision-making process regarding bank selection as comprehensive as possible, future investigations should incorporate additional factors such as client satisfaction, loyalty, service quality, and various other pertinent variables. It is worth noting that not all bank indicators can be accommodated within a single study, and thus, financial indicators were chosen for their aptitude in elucidating a bank's operations. Nevertheless, this research provides valuable insights into bank operations, serving as a foundation for informed decisions and banks should heed these results to enhance their operational efficiency.

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