



Analyzing the Turkish Banks via an MCDM Approach

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Abstract

The nation's economy is significantly impacted by the banking industry. Banks are vital to the economy in developing countries since they accelerate economic growth. As intermediaries, banks' primary aim is to collect funds and utilize them for profitable projects that support profitable, long-term economic growth. An assessment of a bank's performance provides investors and creditors with useful information, among other stakeholders. It reveals the bank's competitiveness in the market and draws attention to both its flaws and growth possibilities. Therefore, it is crucial for stakeholders to assess financial performance. In this paper, we aim to assess the financial performances of the Turkish banks by a novel Multi-Criteria Decision Making method, namely the Root Assessment Method (RAM) technique. Three private banks are found to be the most successful banks. Research on ownership structures reveals that private banks with international participation have superior performance.

Keywords: Banking, Multi-Criteria Decision Making, RAM, Performance

1. Introduction

Banks are crucial institutions in the financial industry as well as instruments for economic growth. Hence, the well-being of its citizens is heavily influenced by the efficacy of its financial system. For several reasons, it is essential to perform effectively the performance of banks, which serve as mediators in the macroeconomic system by providing capital and a range of other financial services to the corporate, retail, and government sectors of the economy (Maredza et al. 2022). The importance of the banking industry and its role in the growth of the national economy make it necessary to assess its performance (Wu et al. 2009).

The banking industry is one of the major drivers of economic growth and is seen most clearly in developing nations where banks are the backbone of growth and investments. The financial performance of banks matters most to constituents like creditors, investors, and policymakers

because it has the ability to demonstrate competitiveness and long-term viability. Traditional financial analysis methods do not account for multiple conflicting criteria simultaneously; hence, the usefulness of Multi-Criteria Decision-Making (MCDM) techniques in assessing performance is regarded as more effective. MCDM techniques, such as TOPSIS, PROMETHEE, and AHP, have been widely applied in banking to calculate performance based on various financial criteria. However, these approaches have some disadvantages, such as sensitivity to subjective weightings and sophisticated calculations. To surmount these challenges, this study applies the Root Assessment Method (RAM), a novel MCDM technique, for the calculation of Turkish banks' financial performance. The RAM technique presents a novel ranking structure while reducing the biasness and computational inefficiencies of alternative methods. The present study aims to provide a more comprehensive and objective assessment of bank performance, differentiating between the performance of private banks with foreign involvement (Wu et al. 2009; Marjanović and Popović, 2020; Sotoudeh-Anvari, 2023).

The rest of the study is organized in that way. The second section presents the performance measurement studies of the banking industry carried out in different countries. The third section details the novel MCDM technique used in the analysis. The last section reports the conclusion and policy implications.

2. Literature Review

The studies focusing on the performance measurement of banks are mostly based on MCDM and DEA. These studies are summarized below.

Beheshtinia and Omidi (2017) seek to assess Iranian banks using a comprehensive methodology. Thus, the weights are determined using modified digital logic (MDL) and analytical hierarchy process (AHP) techniques. Fuzzy TOPSIS and VIKOR are utilized to evaluate the banks. The categories with the lowest proportion of relevance are improving brand value, fostering consumer loyalty, and environmental care. Returned on investment, debt ratio, and reduced energy usage are the three factors with the largest proportion of significance.

Gupta et al. (2021) aim to assess the lending capability of Indian banks in order to determine their overall performance between 2014–15 and 2018–19. They use a hybrid MCDM approach comprising AHP and TOPSIS methods, to assess the financial performance of Indian banks. Each year, private banks are ranked differently in terms of their financial performance metrics. Sama et al. (2022) use many sets of MCDM to analyze Indian banks' performance. Annual reports from the appropriate banks are employed to collect data and measure performance, taking into account several data, which are analyzed using well-known MCDM techniques. The research forms a baseline and demonstrates how HDFC Bank performs better than other private sector banks.

Achi (2023) seeks to assess Algerian banks' operational efficiency and investigate how different factors affect the efficiency. First, the efficiency of Algerian banks is examined by using a two-stage network DEA. In the first stage, the efficiency of the stage and overall performance are assessed using the network DEA. Second, the impacts of explanatory variables on stage efficiency are ascertained by partial least squares (PLS) regression. The primary results reveal that more efficiency is required in both phases of Algerian banks' operations. The Algerian financial industry has become more efficient overall over the research period. The size and age of the bank both positively affect the effectiveness of deposit generation.

Antunes et al. (2022) analyze the 39 Chinese commercial banks' efficiency by using a new DEA-RENNa approach. Results show that efficiency was highest in 2015 but dropped to 0.746

in 2018. State-owned banks were the most efficient, while rural banks were the least efficient. Non-traditional banking activities improved efficiency, but higher costs and profitability reduced efficiency. The study introduces a state-of-the-art non-radial DEA model and RENNA to further mitigate endogeneity by presenting new implications for banking policies and efficiency improvements.

Ghosh and Saima (2021) explore the financial strength of 18 Bangladeshi commercial banks in the COVID-19 pandemic by using MCDM techniques such as TOPSIS and HELLWIG approaches. The findings categorize banks into three robustness levels, where EBL and DBBL are ranked at the highest, and ONEBANK is ranked at the lowest level. Key drivers of resilience are capital adequacy, profitability, non-performing loans (NPLs), and liquidity, whereas better foundations of capital and lower NPLs promote higher resilience. Regulatory intervention is invited by the report to strengthen both liquidity management and capital adequacy and apply good credit risk policies to act as a cushion for future banking crises.

Puri and Verma (2020) propose a hybrid DEA-MCDM approach for ranking DMUs based on cross-efficiency evaluation and subjective preferences of decision-makers. Traditional Data DEA is indiscriminate in identifying efficient DMUs and useless for ranking DMUs. In order to bridge this gap, the study offers a cross-efficiency approach to evaluate DMUs using self-assessment and peer assessment with consideration of aggressive, benevolent, and neutral formulations. These are subsequently enhanced by Ordered Weighted Averaging (OWA) aggregation to allow subjective preference to be utilized in decision-making. An Indian bank test exemplifies the ease of the approach and especially demonstrates the non-performing asset (NPA) impact on efficiency rankings.

3. Methods

3.1 The Ram Method

The RAM approach is a novel MCDM method that sums option scores across decision criteria to determine each option's utility value. The total ranking is then determined using these utility values. This is accomplished by the RAM technique through the employment of an aggregating function that is inversely proportionate to the effect produced by all cost criteria and directly proportional to the profit provided by all favorable criteria. The motivation for the RAM approach is the incapacity of existing MCDM techniques to reliably yield a solution in a choice dilemma, as well as the necessity for the decision maker (DM) to fully understand the decision-making process in order to prevent computational risks. In order to accomplish this, Sotoudeh-Anvari (2023) introduces an aggregating function that uses an expression to rank the options whose sums indicate the cost and benefit criteria of each choice. Although MCDM techniques such as TOPSIS, PROMETHEE, AHP, and VIKOR are commonly used in performance measurement, the RAM approach offers a novel ranking process with its own advantage. In contrast to AHP that is grounded on subjective pair-wise comparisons and consistency checks (Abastante et al. 2019). The RAM technique provides a less subjective decision-making procedure with an easier ranking procedure. The PROMETHEE method employs an outranking approach based on preference functions (Abdullah et al. 2019). The RAM technique can present an alternative ranking structure that enables higher interpretability for DM. The study may improve its methodology contribution and strengthen the case for the use of RAM as a novel approach to bank performance monitoring by clarifying the distinctions via the use of mathematical reasoning and practical experience.

The steps of the RAM method are given below (Sotoudeh-Anvari, 2023).

Step 1. Construct the Decision Matrix

The initial step is to form a decision matrix.

Step 2. Decision Matrix Normalization

The normalization is implemented by using Formula (1).

$$r_{ij} = \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} \quad (1)$$

Step 3. Calculation of Weighted Values

The weighted values are computed below. In this study, the entropy approach is used to determine the criteria weights.

$$y_{ij} = w_j \cdot r_{ij} \quad (2)$$

Step 4. Calculation of Total Normalized Values

The total normalized values are computed based on Formulas (3) and (4) for benefit and cost criteria respectively.

$$S_{+i} = \sum_{j=1}^n y_{+ij} \text{ if } j \in B \quad (3)$$

$$S_{-i} = \sum_{j=1}^n y_{-ij} \text{ if } j \in C \quad (4)$$

Step 5. Calculation Overall Score of Each Alternative

The ranking of each alternative is carried out by using the following aggregation function.

$$RI_i = \frac{2 + S_{-i}}{\sqrt{2 + S_{+i}}} \quad (5)$$

Step 6. Rank the Alternatives

The alternatives are ranked in descending order.

4. Data and Variables

In this study, the primary objective is to evaluate the leading 10 Turkish banks by a novel MCDM method namely the RAM method. The criteria selection of banking sector performance measurement is based on available studies such as (Yazdi et al 2020; Gupta et al. 2021; Marjanović and Popović, 2020). Among the key indicators of a bank's profitability is the return on assets, which are computed as the ratio of net profit to total assets, and the bank's management may use it to assess its earning potential. The capital adequacy ratio (CAR) is a specific metric to assess bank stability in financial terms. Higher CAR values are indicative of better depositor asset safety. The bank's financial liquidity is reflected by the loans-to-deposits (LTD) ratio, which also demonstrates the rate of expansion in credit activity sustainably. Increased LTD levels may be a sign of the bank's increased short-term risk exposure because of possible liquidity issues brought on by unanticipated deposit withdrawals. However, banks sometimes raise this indicator since higher LTD values might result in better profits (Marjanović and Popović, 2020). Because operational expenditures are higher in less competitive contexts, inefficiency becomes a severe problem and shows up as larger spread levels. Hence, operating expenses to total funds ratio is highly significant (Alzoubi and Salem 2022).

The analysis results of the RAM method are presented in Table 1.

Table 1. The Performance Analysis Results of the Turkish Banks Obtained by the RAM Technique.

Turkish Banks	Performance Rankings (2021)	Performance Rankings (2022)
P ₁	1,422	1,446
P ₂	1,421	1,444
P ₃	1,421	1,440
SO ₁	1,420	1,440
SO ₂	1,420	1,437
P ₄	1,419	1,434
P ₅	1,419	1,429
SO ₃	1,418	1,431
P ₆	1,418	1,429
P ₇	1,417	1,422

Source: Authors' Calculations.

where *P* denotes private banks whereas *SO* indicates state owned banks.

As can be inferred from Table 1, the most successful three banks are found to be private banks, which are followed by two state banks. Examining the ownership structure, it is observed that private banks with foreign capital generally perform better. Since the research findings may be used to the development of competitively beneficial policies, they are particularly significant for the management of pertinent financial institutions, and other stakeholders.

Conclusion and Policy Implications

Performance indicators have drawn a lot of attention due to the intense global rivalry (Wu et al. 2009). Practices are interested in bank performance analysis. Using MCDM, bank management may quickly assess the state of the market and take the appropriate action. By allowing the examination of several criteria at various phases of the evaluation process, MCDM analysis techniques offer an advantage over conventional ratio analysis. This enables banks to be compared according to each parameter (Marjanović and Popović, 2020). In our study, the performance of the leading Turkish banks is evaluated by using the RAM method, which is one of the novel MCDM techniques. The results of the study show that the top three Turkish bank groups are composed of private banks. An upward trend in performance rankings suggests that Turkish banks have, on average, increased their financial soundness or operational efficiency. From 2021 to 2022, all listed banks had an improvement in their performance scores, indicating a general upward trend in the industry. This growing tendency might be beneficial to the public and private banking sectors. Innovation, enabling legislation, and operational efficacy are driving it. If state-owned banks had stayed robust and expanded, efforts to improve the stability and functioning of state-owned financial institutions would have been successful. These state-owned banks may also benefit from the loyalty and trust of their customers, which are commonly associated with state-owned enterprises.

The study establishes that the highest-performing institutions are foreign-participated private banks. Investigating the performance of the sector would provide the stakeholders, investors, and policymakers, with a clearer structure of what determines the financial performance. This research is also connected to strategic choice as well as policy implications. The policymakers can use the results to design incentives that favor foreign entry into the market of the banks or design policies that favor competition in the local banks. For instance, underperforming banks can borrow from their better-performing peers, for instance, by adopting digital banking technologies, improving loan portfolio management, or reducing operational cost structures. Bank managers may utilize the RAM technique as a comparative tool to determine the relative performance of their bank against that of its competitors. For instance, a bank that has an average performance, could utilize the RAM technique to analyze specific areas such as

allocating capital, liquidity management, or diversification of revenue. Low-performing banks may improve their financial performance through regulatory adaptation, technology innovations, or strategic refurbishing would provide practical examples of employing the outcomes from the study.

Foreign capital banks have begun to enter the international banking sector in recent years due to causes such as globalization, the fall in profit margins in their home countries, the development of new technologies, etc. They have accomplished this either by purchasing shares in banks that currently function there or by forming banks overseas. Moreover, the financial sector may benefit from the analysis results of the study. Banks can provide a competitive environment that encourages employees to enhance their performance, which benefits the banking sector, by assigning staff ranks according to which they should perform. Private banks' consistent advancements suggest that laws promoting innovation and online banking are most likely beneficial. Legislation should consider presenting incentives for further digital transformation across the banking industry. Given the improvement, authorities may find it beneficial to investigate and support the factors that led to these improvements, such as creative banking techniques, beneficial economic policies, or enhanced risk management.

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