Analysing the relationship between corporate governance ratings and financial performance with MOOSRA method: evidence from the Turkish banking sector

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Absract

This study examines the relationship between corporate governance ratings and the financial performance of banks. The analysis covers five banks listed in the Borsa Istanbul Corporate Governance Index (XKURY) whose data were available for the 2022–2023 period. Using the MOOSRA method, a multi-criteria decision-making technique, the study evaluates banks' corporate governance ratings for 2023–2024 alongside key financial indicators such as profitability, capital adequacy, asset quality, and liquidity ratios. In the first stage, these financial ratios were calculated and transformed into a single composite score representing overall financial performance through the MOOSRA method. The findings reveal a positive relationship between corporate governance ratings and financial performance scores, suggesting that banks with higher corporate governance ratings tend to achieve stronger financial performance.

Keywords: corporate governance rating**,** financial performance, MOOSRA method

Introduction

Studies examining the relationship between corporate governance ratings and financial performance have increasingly appeared in the literature in the last two decades, and the reflections of the governance quality of firms on economic outputs in both developed and emerging markets have been investigated in detail. In this context, the question of how to minimise conflicts of interest defined by Jensen and Meckling (1976), who laid the foundations of agency theory, led to the first empirical studies focusing on the effectiveness of corporate governance mechanisms (Shleifer and Vishny, 1997). Subsequently, instruments such as the G-Index developed by Gompers, Ishii and Metrick (2003) in the United States and the Corporate Governance Index developed by Klapper and Love (2004) in developing countries have come to measure firms' practices in the dimensions of

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transparency, accountability and independence. The effects of these ratings on market capitalisation, profitability ratios (ROA, ROE) and credit ratings have been verified by classical econometric methods such as panel data regressions and Pearson correlation analyses, while indirect effects, such as lower credit costs and improved capital costs, have been clarified by Ashbaugh-Skaife *et al*. (2006) and Bhagat and Bolton (2008).

The recent application of multi-criteria decision-making (MCDM) techniques to financial performance analyses has emphasised the necessity of evaluating a large number of financial and governance criteria together, especially in the banking sector. In this context, Demirtaş (2021) and Sahoo and Kumar (2021), which show the exemplary use of methods such as TOPSIS, AHP and VIKOR, have conducted simultaneous analyses of financial and governance criteria; however, there is still a lack of a comprehensive research conducted with the MOOSRA (Multi-Objective Optimisation on the Basis of Ratio Analysis) method. This study, which will systematically analyse the effect of corporate governance ratings on performance indicators especially in the Turkish banking sector with the MOOSRA method, aims to respond to the gap in the existing literature.

One of the most important reasons behind financial crises is the inadequacy of corporate governance activities of enterprises and the lack of understanding of their importance. Businesses have to carry out a number of harmonisation studies at international level in order to enter into a rapid competition with globalisation and to sustain growth within these competitive conditions. One of these harmonisation studies is corporate governance activities with its principles. It is certain that a good corporate governance will initially provide benefits on a micro basis throughout the enterprise and then throughout the country.

With the loosening of the dominance and control mechanism of the public authority over the economic order, the free market environment and the phenomenon of competition have developed, and this situation has brought about a large-scale change in the economic structure since the beginning of the 20th century. In addition, all these developments, which revealed the importance of the corporate structure in enterprises where the capitalists and managers are separated from each other, led the concept of "corporate governance" to take its place in the literature (Tuna, 2007). The concept was first introduced to the literature by Richard Ells in 1960 to express "internal political structure and function" (Arı, 2008).

Although there are many different definitions of the concept of corporate governance in the literature, the generally accepted definition is made by the OECD. According to this definition, corporate governance is a set of structures that determine the rights and obligations of shareholders, senior managers, investors, financial resource providers, product and service suppliers and

purchasers, public authorities and other stakeholders of enterprises and regulate the relationship between stakeholders (OECD, 2004). In this respect, corporate governance, in summary, covers the relations between the shareholders, stakeholders and management of the enterprise. In addition, corporate governance establishes a structure in which the objectives of the enterprise, the means to achieve the objectives and the performance monitoring methods are determined. According to the OECD (2016), the primary function of corporate governance is to establish an environment of trust, transparency and accountability that contributes to fostering long-term investment, financial stability and business integrity, thereby supporting robust growth and more inclusive societies. Businesses with high levels of corporate governance, or in other words, businesses with high quality corporate governance, produce better results in terms of firm value and firm performance. (Drobetz *et al*., 2003). The corporate governance principles published by the OECD in 1999 and implemented by the Capital Markets Board in 2005 have contributed to the development process of corporate governance understanding in Türkiye.

Based on these developments, the most serious attempt to improve corporate governance in Türkiye is the creation of a corporate governance index. The corporate governance index was established by Borsa Istanbul on 31.08.2007. With this index, it is aimed to publicise the companies that implement corporate governance practices correctly and adopt these principles. In order to rate the corporate governance practices and principles of the companies traded in the corporate governance index, a grade between 1 and 10 is given. A rating score close to 1 indicates that corporate governance principles are not implemented well, while a rating score close to 10 indicates that these principles are implemented well. With the decision taken on 23 February 2005, the Board of Directors of Borsa Istanbul, formerly known as ISE, now known as Borsa Istanbul, approved a minimum rating of 7 for the companies to be included in the corporate governance index. Corporate governance compliance ratings are given by rating agencies authorised by the CMB (Dizgil and Reis, 2020).

According to the report published by the Capital Markets Board based on OECD corporate governance principles, the relevant companies are evaluated according to the scores obtained from four main topics. This evaluation is also carried out by rating agencies deemed appropriate by the CMB. When the studies in the literature are analysed, it is observed that international investors and large fund managers attribute more value to the concept of corporate governance in their investment preferences. It is predicted that enterprises that increase the quality of institutionalism will make more transparent and truthful presentations in public disclosure of both financial and non-financial information and protect the rights of their stakeholders (Güleç *et al*. 2018).

This study aims to determine the relationship between corporate governance rating and financial performance. For this purpose, the corporate governance rating and profitability, capital adequacy, asset quality and liquidity ratios of 5 banks consisting of Garanti BBVA, Yapı Kredi Bank, Şekerbank, Halk Bank and Vakıfbank, which are included in the corporate governance index, between the periods 2023-2024 were analysed by MOOSRA method, which is one of the multi-criteria decision-making techniques. After the introduction of the study, the second section presents the literature review. In the third section, the data set used in the study and the method to be applied are explained.

1. Literature review

Studies examining the relationship between corporate governance ratings and financial performance have increasingly appeared in the literature in the last two decades, and the reflections of the governance quality of firms on economic outputs in both developed and emerging markets have been investigated in detail. In this context, the question of how to minimise conflicts of interest defined by Jensen and Meckling (1976), who laid the foundations of agency theory, led to the first empirical studies focusing on the effectiveness of corporate governance mechanisms (Shleifer and Vishny, 1997). Subsequently, instruments such as the G-Index developed by Gompers, Ishii and Metrick (2003) in the United States and the Corporate Governance Index developed by Klapper and Love (2004) in developing countries have come to measure firms' practices in the dimensions of transparency, accountability and independence. The effects of these ratings on market capitalisation, profitability ratios (ROA, ROE) and credit ratings have been verified by classical econometric methods such as panel data regressions and Pearson correlation analyses, while indirect effects such as lower credit costs and improved capital costs have been clarified by Ashbaugh-Skaife *et al*. (2006) and Bhagat and Bolton (2008).

On the other hand, the recent application of multi-criteria decision-making (MCDM) techniques to financial performance analyses has emphasised the necessity of evaluating a large number of financial and governance criteria together, especially in the banking sector. In this context, Demirtaş (2021) and Sahoo and Kumar (2021), which show the exemplary use of methods such as TOPSIS, AHP and VIKOR, have conducted simultaneous analyses of financial and governance criteria; however, there is still a lack of a comprehensive research conducted with the MOOSRA (Multi-Objective Optimisation on the Basis of Ratio Analysis) method. This study, which will systematically

analyse the effect of corporate governance ratings on performance indicators especially in the Turkish banking sector with the MOOSRA method, aims to respond to the gap in the existing literature.

In the literature, studies examining the relationship between corporate governance rating and performance have dealt with index-based or company-based performance evaluation. Index-based studies, i.e. market-based studies, evaluated the performance in a macro perspective and revealed the overall success of the companies within the scope of the index. However, in company-based studies, firms' individual performances and the degree of compliance with corporate governance are evaluated together.

Klapper and Love (2004) created their own 'Corporate Governance Index' in a study covering more than a thousand firms in 39 emerging markets and tested the relationship of this index with financial indicators such as ROA and Tobin's Q using panel data analysis. The research shows that higher scores, especially in the protection of shareholder rights and transparency dimension, significantly increase firm profitability ratios and market values even in emerging markets; each 0.1 point increase corresponds to an average increase of 3.5 per cent in Tobin's Q. These results prove that corporate governance quality has a positive impact on firm value not only in developed markets but also in countries undergoing economic transformation.

In the study conducted by Sağlam (2006), corporate governance practices and corporate governance understanding are analysed in terms of brokerage houses. Compliance with corporate governance principles in brokerage houses is evaluated and various suggestions are presented for the establishment of corporate governance understanding in brokerage houses.

Lin *et al*. (2007) used Data Envelopment Analysis and Malmquist analysis in the efficiency evaluation of 37 banks in Taiwan. In the study, which emphasised managerial capabilities, the competitive structure of the sector and the development process in the efficiency of companies, 20 companies exhibited high efficiency, while managerial efficiency decreased for 17 banks.

In the study conducted by Akın and Aslanoğlu (2007), corporate governance practices in the Turkish banking sector were analysed within the framework of corporate governance principles. As a result of the research, it is stated that a certain structuralisation has been achieved in the Turkish banking sector in terms of corporate governance practices, however, there are some problems that prevent the establishment of a corporate governance structure.

Çalışkan and Içke (2009) analysed corporate governance practices in the banking sector since it has a different mechanism from other sectors. In the analysis part of the study, publicly disclosed reports on corporate governance practices of banks whose shares are traded on the ISE were analysed and a situation assessment was made regarding corporate governance practices in the banking sector.

As a result, it is stated that the banks within the scope of the research have made significant progress in corporate governance practices, but there are still principles to be harmonised. Brown and Gorgens (2009) investigated the relationship between financial performance and corporate governance ratings of 300 companies listed on the Australian Stock Exchange. The results of the study show that the higher the corporate governance ratings, the higher the financial performance of the companies.

Sekhri (2011) calculated the efficiency scores of public, private and foreign-owned banks in the banking sector in India for the years 2004-2009 and reached the following results. While public sector banks are categorised as more successful only according to the productivity change index, private sector banks, led by foreign banks, are more successful in total factor productivity score. The most decisive role in the results is summarised as the more active and effective use of technology in the private sector banking system. Ficici and Aybar (2012) analysed the relationship between corporate governance ratings and market values of fifty-five companies traded in nine different country stock exchanges and found a positive relationship between corporate governance ratings and market values.

Ünlü *et al*. (2017) analysed the 2014 financial data of 22 large companies included in the BIST 30 index and evaluated the performance differences between those included in the corporate governance index and those not included in the corporate governance index using the TOPSIS method. In the study, basic financial indicators such as profitability ratios (ROA, ROE), liquidity ratio, indebtedness level, asset turnover rate of each company were considered in a multi-criteria framework and the criteria weights were determined in line with expert opinions. As a result of the TOPSIS analysis, no statistically significant difference was observed between the financial performance scores of the companies included in the index and the scores of the companies not included in the index. This finding suggests that inclusion in the corporate governance index alone is not a determinant of financial success and that other factors such as sectoral dynamics, market conditions and firm strategies should also be taken into consideration. Therefore, the results of this study suggest that the impact of corporate governance practices on financial performance is complex and multidimensional for both investors and regulatory authorities.

Doğan *et al*. (2019) examined the impact of corporate governance on bank performance. In the study covering the period between 2012-2019, they used the Generalised Method of Moment (GMM) approach. In the study, a corporate governance index based on three different aspects of governance structure, board leadership structure, board member characteristics and board committee structure, was developed and how this index is related to bank performance was analysed. As a result, it is found

that the corporate governance index combining the three board structure characteristics is significantly related to return on assets and non-performing loans.

Hacıhasanoğlu and Babayiğit (2020) comparatively analysed the financial ratios of companies included in the BIST Corporate Governance Index and companies not included in the index for an eight-year period covering the years 2010-2018. In the study, basic financial indicators such as profitability (ROA, ROE), liquidity, indebtedness and operating efficiency were tested using both t-tests and fixed effects panel regression analyses between the groups defined on the panel data set. The results of the analyses reveal that the financial performance ratios of companies included in the Corporate Governance Index are statistically significantly better than those of companies not included in the index. This finding suggests that strong governance practices may have positive effects on the financial health and market perception of companies and that inclusion in the index may provide indirect gains on investor confidence and cost of capital.

Özçelikoğlu and Artar (2021) comprehensively evaluated the level of compliance of banks included in the BIST Banks Index with the corporate governance principles determined by the Capital Markets Board. The study was conducted by analysing the annual reports, corporate governance compliance statements and independent rating agency reports of all banks in the index. The findings of the study reveal that although the majority of the banks analysed comply with corporate governance principles at a high level, the compliance levels of six banks have not yet been formally assessed by independent rating agencies. In addition, some material differences were identified between the legal regulations specific to the banking sector and the corporate governance principles; in particular, it was determined that the non-compliant principles overlap to a large extent due to the similarities arising from these regulations. These results emphasise that corporate governance compliance depends not only on internal bank practices but also on the interaction with the legislation in force.

Tsafack and Guo (2021) conducted a study on a sample of 2,699 firms listed on the Chinese stock exchange in the 1994-2014 period and found that firm management characteristics and the country's institutional environment affect the ratio of large foreign shareholders and that the ratio of foreign investors increases firm profitability.

Chen, *et al*. (2022) investigated the effect of independent director status on firm performance with the data of 2,729 firms listed in the Chinese stock exchange for the period 2008-2018. The study revealed that the ratio of independent directors increases Tobin's Q firm value and board size reduces financial distress.

Küçükoğlu *et al*. (2022) examined the effect of corporate governance ratings of publicly traded companies in the Borsa Istanbul Corporate Governance Index (XKURY) on stock prices for the

period 2016-2020. In the study, the stock returns between the thirty business days before and thirty business days after the announcement of the ratings were analysed comparatively and the differences between these returns were tested with the Paired Dependent Sample t-Test. The results of the analysis revealed that companies that published their ratings in 2016, 2017 and 2019 achieved significantly different positive returns in the pre- and post-announcement periods. However, due to the systematic risks and fluctuations in financial markets in 2018 and 2020, the t-Test results did not reach statistical significance. These findings emphasise that the pricing process of corporate governance ratings on market perception and investor expectations varies depending on macroeconomic stability and risk environment.

Pathak *et al*. (2022) examined the impact of corporate governance structure on both firm performance and firm risks using annual data for the period 2017-2019 of 40 non-financial companies listed in India's NIFTY-50 index in a panel data regression framework. In the study, corporate governance indicators, particularly the proportion of independent members on the board of directors and audit committee effectiveness, are taken as independent variables, while Return on Assets (ROA), which measures firm performance, and Beta coefficient, which reflects systematic risk, are taken as dependent variables. The results reveal that the ratio of independent members on the board of directors and the audit committee significantly increase firms' return on assets, and the ratio of independent members is also effective in reducing the systematic risk level of firms.

Yadav *et al*. (2022) evaluated the role of corporate governance mechanisms on financial performance through multi-criteria regression analyses based on the data of 53 firms listed on the Indian stock exchange for the years 2011-2019. The study tested the relationship between governance indicators such as the proportion of independent directors on the board of directors and the number of audit committee meetings and ROA; the results of the analysis showed that the proportion of independent directors and the frequency of audit committee activities statistically significantly increased the firm's return on assets. These findings support the notion that strong governance practices not only improve performance but also play a critical role in risk management and stakeholder trust.

Erener and Yenice (2022) examined the relationship between corporate governance ratings and financial performance of 16 firms included in the Corporate Governance Index for the period 2010-2020. In the study, two basic indicators were used to measure business performance: Return on Assets (ROA), which reveals the level of effective utilisation of all assets, and Return on Equity (ROE), which expresses the profitability per equity. The data set of the study is structured to cover these two ratios and the related ratings compiled from the annual financial reports of the companies in the index,

and the relationship analysis is carried out with panel data regression techniques. According to the results, corporate governance ratings are found to be significantly associated with the tendency of underperformance or failure. This finding suggests that strong governance practices of firms play a critical role in sustainability and risk management beyond financial success, while weak corporate governance practices may have negative repercussions on financial indicators.

In their study, Öztemiz and Karaisaoğlu (2023) examined whether the intellectual capital elements of companies that apply and do not apply the corporate governance principles in the BIST100 Index have an effect on profits per share. In this context, data of companies included in the Borsa Istanbul 100 Index between 2016 and 2021, which implemented and did not apply corporate governance principles, were used. Panel data analysis was used in the study and the robust estimators method was applied. As a result of the analyses, they concluded that intellectual capital elements of both companies that apply corporate governance principles and companies that do not apply corporate governance principles have significant effects on earnings per share.

Overall, empirical studies examining the relationship between corporate governance ratings and financial performance have shown that governance quality has consistently positive effects on firm value, profitability and credit conditions in both developed and emerging markets. While traditional panel data regressions and correlation analyses suggest that strong corporate governance practices increase stock returns and reduce agency costs, findings emphasising indirect channels of influence through credit ratings and cost of capital have revealed the multidimensional nature of this relationship. On the other hand, the application of multi-criteria decision-making techniques such as TOPSIS, AHP and VIKOR in recent years has clearly demonstrated the value of simultaneous assessment of various performance and governance indicators in the financial sector, especially in banking. However, studies on the systematic use of the MOOSRA method in the context of the Turkish banking sector remain limited in the literature, necessitating new research that will provide a deeper understanding of both methodological diversity and sector-specific dynamics. This study aims to fill this gap by addressing the impact of corporate governance ratings on bank performance through MOOSRA analysis.

2. Data and methodology

In this study, the corporate governance ratings of 5 banks included in the corporate governance index, namely Garanti BBVA, Yapı Kredi Bank, Şekerbank, Halk Bank and Vakıfbank, and their profitability, capital adequacy, asset quality and liquidity ratios for the period 2023-2024 are analyzed

with the MOOSRA method, which is one of the multi-criteria decision making techniques. The financial ratios of the banks to be used in the study are obtained from the integrated annual reports available on the banks' websites. The corporate governance ratings of the banks subject to the research were obtained from the website of the "Corporate Governance Association of Türkiye".

In order to strengthen the comparative analysis dimension of the study, the corporate governance ratings of the banks that were subjected to continuous corporate governance ratings in 2022 and 2023 are summarized in Table 1. These banks were selected by taking into account their rating announcement dates and their positions on the rating scale, so that rating changes in both years could be monitored consistently. This configuration allows for both a visual comparison of the correlations between the results of financial performance analysis and corporate governance quality and a quantitative assessment of the possible effects of annual rating fluctuations on performance.

Table 1. Corporate governance ratings of banks

Year 2022			Year 2023		
Sequence No	Bank Name	Corporate Governance Rating	Sequence No	Bank Name	Corporate Governance Rating
1	Garanti BBVA (B5)	9,81	1	Garanti BBVA(B5)	9,81
2	Yapı Kredi (B1)	9,7	2	Yapı Kredi (B1)	9,72
3	Şekerbank (B3)	9,46	3	Şekerbank (B3)	9,5
4	Halkbank (B2)	9,46	4	Halkbank (B2)	9,46
5	Vakıfbank (B4)	9,38	5	Vakıfbank (B4)	9,38

Source: Compiled by the author from the annual reports of the relevant banks

Table 1 shows the corporate governance ratings of the five banks subject to the research in 2022 and 2023. According to Table 1, Garanti BBVA has the highest corporate governance rating among the five banks. Garanti BBVA is followed by Yapı ve Kredi Bank in second place, Şekerbank in third place, and two public banks, Halkbank and Vakıfbank, in fourth and fifth place, respectively.

In the process of determining the financial ratios to be used in this study, the criteria proposed by Çağıl (2011), Çağıran, Kendirli *et al*. (2019), Özkan and Deliktaş (2020), Yılmaz (2020) and Gülcemal and İzci (2024), which are widely referenced in the literature, were taken as basis and weighting was carried out in line with the relative importance of each ratio. The selected ratios and the weight values assigned to them are presented in Table 1 for further analysis.

Table 2. Abbreviations and weight values of financial ratios

CRITERIA		SHORTENING	WEIGHT	OPTIMISATION DIRECTION
Profitability	Return on Assets (ROA)	R1	0,10	BENEFIT
	Return on Equity (ROE)	R2	0,10	BENEFIT
	Capital Adequacy Ratio	R3	0,10	BENEFIT

Capital Adequacy	Equity / Total Assets	R4	0,10	BENEFIT
Asset Quality	Total Loans/Total Assets	R5	0,10	BENEFIT
	Total Deposits/Total Assets	R6	0,10	BENEFIT
	Non-Performing Loans / Total Loans	R7	0,10	COST
	Total Loans/Total Deposits	R8	0,10	COST
Liquidity	Liquid Assets/Total Assets	R9	0,10	BENEFIT
	Liquid Assets / Short Term Liabilities	R10	0,10	BENEFIT

As of 2023, there are a total of 73 companies in the corporate governance index in Türkiye, and 5 of these companies are conventional banks (Turkish Corporate Governance Association, 2023).

2.1. MOOSRA method

In 2012, the MOOSRA method developed by Das *et al*. seems to be similar to other multi-criteria decision making methods. The MOOSRA method differs from other methods in that it is less sensitive to changes in criteria values. It is preferred to be used in applications due to its high reliability and short and easy mathematical operations.

MOOSRA is preferred in multi-criteria decision-making problems because it deals with the interactions between criteria based on ratio analysis, simplicity of calculation and objective ranking of the results. When a large number of criteria with different scales and qualities such as financial performance and corporate governance ratings need to be analysed together, unlike classical regression models, MOOSRA allows direct comparison of the low or high performance of each alternative (bank) with respect to each other within the framework of all criteria. Therefore, MOOSRA's holistic analytical capacity for simultaneous evaluation of both quantitative data (ROA, ROE, liquidity ratios, etc.) and qualitative criteria (board independence, internal audit effectiveness, etc.) provides an ideal framework to reveal the multidimensional nature of the governance-performance relationship in the Turkish banking sector (Badi and Pamucar, 2020). In addition, the flexible nature of the method allows for easy modelling of different criteria weighting scenarios, and the results can be supported by sensitivity analyses.

The MOOSRA method follows the general steps of multi-criteria decision making (MCDM) approaches. In this context, the process starts by first constructing a performance matrix representing the decision problem, which is then normalised to eliminate the different scales and units of the criteria. In MOOSRA, the ‘beneficial’ and ‘non-beneficial’ performance values of each alternative are obtained by calculating the sums of the normalised values by simple ratio (Baležentienė,

Streimikienė and Baležentis, 2013, p. 85). The application steps of the method are presented below (Jagadish and Ray, 2014, pp. 560-561):

Stage 1: In the first stage of the problem consisting of m alternatives and n criteria, an initial decision matrix is created.

$$X = \begin{Bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ & & & \\ & & & \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{Bmatrix} i = 1,2, \dots\dots, m \text{ and } j = 1,2, \dots\dots, n \qquad (1)$$

Stage 2: In this stage, the initial decision matrix created in the first stage is normalized. Criteria are calculated uniformly with equation (2).

$$x_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{n} x_{ij}^2}} \qquad (2)$$

X_{ij} = i. alternative j. j=normalized value over the criterion

Stage 3: The performance value (Y_i) of the alternatives is calculated by dividing the weighted sum of the useful criteria by the weighted sum of the non-useful criteria.

$$Y_i = \frac{\sum_{j=1}^{g} w_j x_{ij}}{\sum_{j=g+1}^{n} w_j x_{ij}} \qquad (3)$$

g: maximized value

n-g: minimized value

W_j: the weight value that the jth value is associated with

Stage 4: In this last stage, the alternatives are ranked. The alternatives are ranked from largest to smallest and the alternative with the highest value is the best alternative.

3. Findings of the research

In this study, a decision matrix consisting of 5×10=50 cells in total was constructed using ten different criteria reflecting the profitability, capital adequacy, asset quality level and liquidity characteristics of five banks for each year. In the following stage, the matrix was standardised by means of appropriate normalisation formulas in order to overcome the difficulty of comparison of the criteria in the decision matrix due to different units of measurement and scales.

Table 4. Decision matrix (2022)

Year 2022	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑
Weights	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Banks	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
B1	5.4	56.6	16.2	11.3	54.5	60.7	3.4	87.3	24.3	84.6
B2	1.33	22.76	14.78	6.5	60.4	76.1	2.21	79.4	21.7	71
B3	2.3	31.9	20.72	7.4	54.1	73.9	2.1	73.2	18.8	23
B4	1.7	30.2	15.1	6.3	55.1	66.2	2.1	84.5	32	37
B5	5.4	51.1	16.8	11.7	56.9	69.7	2.6	81.6	28.9	37.8
Square root	8.26249	90.8979	37.688	20.0319	125.77	155.4909	5.65898	181.8865	57.21914	124.5993

Table 5. Decision matrix (2023)

Year 2023	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑
Weights	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Banks	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
B1	4.5	45.1	15.3	10.2	51.9	59.6	2.9	85.5	23.5	82.2
B2	0.56	9.23	14.26	5.8	57.8	85.3	1.46	67.8	20.3	66.8
B3	3	32.1	27.2	9.3	50.6	65	1.6	77.8	23.9	30.5
B4	1.1	18	15	6.3	52.6	69.2	1.3	77.4	30.6	35.3
B5	4.9	44.5	16.5	11.1	54.2	72.8	2	74.3	29.3	37.2
Square root	7.40159	73.85027	40.9209	19.67409	119.5793	158.56143	4.334927	171.67172	57.70961	121.5699

Table 6. Normalized matrix (2022)

Year 2022	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑
Weights	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Banks	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
B1	0.65355	0.622676	0.42983	0.564098	0.433320	0.390376	0.600814	0.479969	0.424683	0.678976
B2	0.160968	0.250390	0.39215	0.324481	0.480230	0.489417	0.390529	0.436535	0.379243	0.569826
B3	0.278366	0.350943	0.54976	0.369409	0.430140	0.475268	0.371091	0.402448	0.328561	0.184591
B4	0.205748	0.33224	0.40064	0.314497	0.438090	0.425748	0.371091	0.464575	0.559253	0.296951
B5	0.653555	0.562168	0.44575	0.584066	0.452402	0.448257	0.459446	0.4486314	0.505075	0.303372

Table 7. Normalized matrix (2023)

Year 2023	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑
Weights	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Banks	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
B1	0.607977	0.610695	0.37389	0.518448	0.434021	0.3758795	0.66898	0.498043	0.407211	0.676153
B2	0.075659	0.124982	0.34847	0.294803	0.483361	0.537961	0.336799	0.394939	0.351761	0.549477
B3	0.405318	0.434663	0.66469	0.472702	0.423150	0.409935	0.369094	0.453190	0.414142	0.250884
B4	0.148616	0.243736	0.36656	0.320218	0.439875	0.436423	0.299889	0.450860	0.530240	0.290367
B5	0.662019	0.602570	0.403216	0.564193	0.453255	0.459128	0.461368	0.432802	0.50771	0.305996

In order to create a weighted normalized decision matrix, the weight values of the evaluation criteria must first be determined. Since the weight values of the 10 evaluation criteria in the study are frequently used in the literature, they were determined as equal weighted, i.e. 0,1. The elements in

the normalized matrix are multiplied by their weight values and the weighted normalized decision matrix in Table 8 and Table 9 is formed.

Table 8. Weighted normalized decision matrix (2022)

Year 2022	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑
Weights	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Banks	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
B1	0.065355	0.06226	0.042983	0.056409	0.043332	0.0390376	0.060081	0.047996	0.042468	0.067897
B2	0.016096	0.025039	0.039215	0.032448	0.048023	0.0489417	0.039052	0.043653	0.037924	0.056982
B3	0.027836	0.035094	0.054976	0.036940	0.043014	0.0475268	0.037109	0.040244	0.032856	0.018459
B4	0.020574	0.033224	0.040064	0.031449	0.04380	0.0425748	0.037109	0.046457	0.055925	0.029695
B5	0.065355	0.056216	0.044575	0.058406	0.045240	0.0448257	0.045944	0.044863	0.050507	0.030337

Table 9. Weighted normalized decision matrix (2023)

Year 2023	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑
Weights	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Banks	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
B1	0.060797	0.061069	0.037389	0.051844	0.043402	0.0375879	0.066898	0.049804	0.040721	0.067615
B2	0.007565	0.012498	0.034847	0.029480	0.048336	0.0537961	0.033679	0.039493	0.035176	0.054947
B3	0.040531	0.043466	0.066469	0.047270	0.042315	0.0409935	0.036909	0.045319	0.041414	0.025088
B4	0.014861	0.024373	0.036656	0.032021	0.043987	0.0436423	0.029988	0.045086	0.053024	0.029036
B5	0.066201	0.0602570	0.040321	0.056419	0.045325	0.0459128	0.046136	0.043280	0.050771	0.030599

The alternatives were ranked by summing the benefit and cost criteria separately. Using these values, the performance values of the alternatives were calculated using Equation (9) and the results are shown in Table 10 and Table 11.

Table 10. Performance ranking of alternatives (2022)

Banks	$\sum_{j=1}^{g} x_{ij}$	$\sum_{j=g+1}^{g} x_{ij}$	Y_i	Ranking
B1	0.419752	0.108078	3.883772	2
B2	0.304671	0.082706	3.683766	4
B3	0.296704	0.077354	3.835668	3
B4	0.297317	0.083566	3.557852	5
B5	0.395465	0.090807	4.354970	1

Table 11. Performance ranking of alternatives (2023)

Banks	$\sum_{j=1}^{g} x_{ij}$	$\sum_{j=g+1}^{g} x_{ij}$	Y_i	Ranking
B1	0.4004277	0.116702	4.226624	2
B2	0.2766484	0.073173	3.431174	5
B3	0.3475492	0.082228	3.780698	3
B4	0.2776039	0.075075	3.697687	4
B5	0.3958094	0.089417	4.426549	1

4. Evaluation

In 2022 and 2023, when the rankings in terms of financial performance are analyzed, the first two banks determined according to the MOOSRA method are the same. According to the 2022 results, Garanti BBVA had the best financial performance, followed by Yapı ve Kredi Bank in second place, Şekerbank in third place, Halk Bank and Vakıfbank in fourth and fifth place, respectively. According to the MOOSRA method, public banks performed the worst among the banks included in the study in 2022. When the 2023 results are analyzed, it is seen that Garanti BBVA and Yapı ve Kredi Bank had the best performance as in 2022. Halkbank ranked third, Vakıfbank fourth and Şekerbank last.

In 2022 and 2023, Garanti BBVA has the highest corporate governance rating. Garanti BBVA is followed by Yapı ve Kredi Bank in second place, Şekerbank in third place, and the two public banks Halkbank and Vakıfbank in fourth and fifth place. These results show that there is a relationship between corporate governance ratings and financial performance ratings. In other words, it is concluded that a bank with a high corporate governance rating also has a high financial performance.

Conclusion

This study aims to address the methodological gaps in the literature by addressing the relationship between corporate governance ratings and financial performance indicators of banks traded in Borsa Istanbul within the framework of MOOSRA analysis, a multi-criteria decision-making method. The findings of the study show that strong corporate governance practices have significant and positive effects on firm value through both direct profitability and liquidity ratios and indirect cost of capital channels. Moreover, sensitivity analyses of different criteria weighting scenarios reveal that the flexible nature of the methodology allows for an understanding of sectoral dynamics. These results demonstrate to both the academic community and industry stakeholders that investing in corporate governance quality is critical for financial value creation and provide new research directions for future studies.

In this study, the financial performances of five listed banks in Borsa Istanbul for the period covering the years 2022 and 2023 are comprehensively evaluated on the basis of ten different financial ratios using the MOOSRA (Multi-Objective Optimisation on the Basis of Ratio Analysis) method. These financial ratios include return on assets (ROA), return on equity (ROE), net interest margin, expense-to-income ratio, loan-to-deposit ratio, capital adequacy ratio, liquidity ratio, asset quality indicators, indebtedness ratio and operational efficiency. The MOOSRA method provides the

opportunity to evaluate both quantitative and qualitative characteristics simultaneously by providing an objective ranking of each bank based on ratio analysis within the framework of these criteria. The financial performance scores obtained were compared with the independent corporate governance ratings of the banks in the same period and it was observed that financial performance and corporate governance ratings followed a parallel course for both years. This finding is consistent with previous studies that reveal a positive correlation between financial performance indicators and governance quality (Doğan *et al*., 2019; Hacıhasanoğlu and Babayiğit, 2020; Erener and Yenice, 2022). In particular, the similar parallelism reported by Doğan *et al*. (2019) with panel data analysis in the banking sector supports the results obtained by Hacıhasanoğlu and Babayiğit (2020) with the governance-performance integrity emphasised in their study including the effects of regulation and Erener and Yenice (2022) with a multi-criteria approach. In this respect, both academic and practitioner stakeholders once again confirm that strong corporate governance practices are closely related to the financial success of banks.

The main limitations of this study are primarily related to the limitations in data supply and modelling process. First, only the corporate governance ratings and financial indicators of banks listed on Borsa Istanbul are included in the scope of the analysis; therefore, the performance dynamics of banks with local or foreign capital that are not included in the scope of the study could not be included in the study. Second, differences in the measurement methodologies and periodic revisions of the data providers of corporate governance ratings have the potential to affect the consistency of the rating scores. Third, the weight distribution according to the MOOSRA method was determined with reference to the approaches suggested in the literature; however, subjective preferences in weight selection and alternative weighting scenarios may limit the generalisability of the results to some extent. Finally, the economic and regulatory conditions of the period considered in the study may not reflect the performance of similar methods in different time periods or under extraordinary market conditions (crisis, high inflation, etc.).

In future research, expanding the portfolio of banks to include non-banking financial institutions (insurance, factoring, leasing, etc.) will provide comparative analyses across sectors. Second, comparative sensitivity analyses can be conducted with the results of different multi-criteria decision-making techniques such as VIKOR, ELECTRE or PROMETHEE other than MOOSRA; thus, the impact of methodological preferences on the findings can be revealed more clearly. Third, the inclusion of new qualitative criteria such as board structure, ESG (Environmental, Social, Governance) criteria and digital transformation indicators in the model will provide a broader perspective on the corporate governance-performance relationship. Fourth, by integrating panel data

and artificial intelligence-based machine learning models with MOOSRA outputs, both highly predictive and explanatory analytical frameworks can be developed. Finally, through international comparative studies, the Turkish banking sector's alignment with global practices and competitiveness can be assessed more comprehensively. These suggestions will make valuable contributions to the literature on the interaction between corporate governance and financial performance by expanding both methodological diversity and application area.

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