Araştırma Makalesi / Research Article

Financial Performance Measurement with MAIRCA Method: Application on Turkish Banking Sector[1]

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Abstract
This study was conducted to determine the financial performance measurement using eight financial ratios of 11 banks with total assets of 1% or more in 2021. The financial ratios of banks between 2014-2021 were obtained and analyzed using the MAIRCA method. According to the findings, the bank with the best performance in 2021 is İşbank. The bank with the worst performance in the same year was VakıfBank. DenizBank showed the best financial performance between 2016-2018. Yapı Kredi had the worst financial performance between 2016-2017. The most striking result is that Halkbank displayed the worst financial performance between 2018-2019.

Keywords: *Turkish Banking System, Financial Performance, Multi-Criteria Decision Making, MAIRCA Method*

JEL Codes: *G10, G17, G21*

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MAIRCA Yöntemi ile Finansal Performans Ölçümü: Türk Bankacılık Sektörü Üzerine Uygulama

Öz

Bu çalışmada, 2021 yılında toplam aktifleri %1 ve üzerinde olan 11 bankanın 8 finansal rasyosu kullanılarak finansal performans ölçümünü tespit etmek amacıyla gerçekleştirilmiştir. Bankaların 2014-2021 yılları arası finansal rasyoları elde edilmiş ve MAIRCA yöntemi kullanılarak analiz gerçekleştirilmiştir. Elde edilen bulgulara göre 2021 yılında en iyi performansa sahip bankanın İş Bankası olduğu görülmektedir. Aynı yıl en kötü performansa sahip banka ise VakıfBank'tır. 2016-2018 yılları arasında en iyi finansal performansı Denizbank göstermiştir. Yapı Kredi ise 2016-2017 yılları arasında en kötü finansal performansa sahip banka olmuştur. Halkbank'ın ise 2018-2019 yılları arasında en kötü finansal performansı sergilemiş olması en dikkat çekici sonuçlar arasındadır.

Anahtar Sözcükler: *Türk Bankacılık Sistemi, Finansal Performans, Çok Kriterli Karar Verme, MAIRCA Yöntemi*

Jel Kodları*: G10, G17, G21*

1. Introduction

Finance is the process of deducting expenses from income, directing the remaining savings to investment instruments and providing the most appropriate financing method when savings are insufficient. The financial system is an important building block for the economy. Banks, on the other hand, are financial institutions that help direct economic policies to evaluate the savings of households and businesses and meet various financing needs. As in other businesses, banks are organizations that maintain their costs at an optimal level, act within the framework of social responsibility, and continue their activities for profit. Within this system, banks strive to be a locomotive for economies to achieve their growth targets by creating employment, and for households and business investments by providing loans.

With globalization, countries' orientation towards international financing sources has become more intense and rapid. Companies have been using international financing sources more actively. This situation necessitates the integration of the financial markets. The 2008 mortgage crisis, which has the characteristics of a global economic crisis, has shown the whole world that financial systems should be audited more frequently, and banks should have a strong financial structure. After the 2001 financial crisis, Turkey was able to overcome the effects of the 2008 crisis relatively unscathed thanks to the restructuring of the banking sector (Kevser, 2021). Considering that the banking sector is one of the sectors that may be most

affected by economic crises that may be experienced in the future, the strong financial structures of the banking sector will help policymakers overcome the problems that may arise during an economic crisis. Therefore, evaluating the financial performance of banks, which have the largest share in the financial system, is necessary for shareholders, management, new investors, policymakers, and businesses.

As of November 2023, there are 55 banks in Turkey, including 3 public deposit banks, 21 foreign-owned banks, and the remaining privately owned banks. These banks have approximately 9,500 domestic branches and employ 190,000 personnel. The sector has an asset size of 21 trillion 98 billion TL, with TL 13 trillion in deposits and TL 11 trillion in loans (BRSA, 2023). It is the most important pillar of the economic and financial structure, and requires a strong financial structure to use its resources efficiently. Therefore, measuring bank financial performance is crucial (Yetiz and Kılıç, 2021). This enables banks to use their resources effectively and efficiently.

In the study, financial performance analysis was carried out through the MAIRCA method with the data of 11 deposit banks with a total asset size of 1% and above in 2021. 11 deposit banks' financial ratios including Capital Adequacy Ratio, Equity / Total Assets, Non-Performing Loans / Total Loans, Liquid Assets / Total Assets, Return on Average Assets, Return on Average Equity, Interest Income / Total Revenues, Net Profit per Branch, obtained from the balance sheets of the 11 deposit banks for the years 2014-2021 were analyzed and banks were ranked according to their financial performance. For the analysis, the most commonly used ratios in the studies of (Akgül, 2021; Bektaş, 2021; Kemal and Saygın, 2022; Yetiz and Kılıç, 2021; Yılmaz and Yakut, 2021) were used. Weighting in the analysis was carried out by considering the weighting of financial ratios in these studies. In this way, it is recommended in other studies in the literature to analyze financial performances according to the MAIRCA method. In this way, it is aimed to compare the findings obtained in the past with the results obtained with the MAIRCA method.

2. Literature Review

In parallel with the in recent negative economic and financial developments in our country, there has been an increase in the number of studies on the banking sector. Ranking the financial performance of banks through Multi-Criteria Decision-Making Methods (MCDM) is one of the most important and researched topics among studies. MCDM methods are based on classical or fuzzy logic and have been developed to solve problems. PROMETHEE, ELECTRE III, TOPSIS, WASPAS, VIKOR, COPRAS, and MOORA methods are the most frequently used methods for evaluating the financial performance of enterprises. On the other hand, the MAIRCA

method has recently emerged as a relatively new MCDM method. In the MAIRCA method, the use of a linear normalization technique in the standardization phase of the data provides more reliable results. In the literature, it is generally observed that the financial performance of banks is analyzed and ranked using MCDM methods other than MAIRCA. Since the MAIRCA method provides more reliable results than other MCDM methods (Yazgan and Agamyradova 2021), bank financial performance was analyzed using the MAIRCA method. There are many studies on bank financial performance. Table 1 summarizes the studies conducted after 2021.

Table 1. Literature Review on Financial Performance of Banks

Author	Sample	Period	Methods	Findings
(Kevser, 2021)	12 banks operating in Turkey	2013-2018	Anova and Bonferroni tests	Private banks outperform public banks in terms of profitability. The ratio of participating banks' net non-performing loans to total assets is high. Foreign banks perform the best when net interest income is compared to the total assets.
(Yetiz and Kılıç, 2021)	The 15 deposit banks operating in Turkey	2015-2019	VIKOR Method	The most successful banks were Ziraat Bank in 2015, 2016, 2017, followed by ING Bank in 2018, 2019. The least successful banks were HSBC Bank in 2015, 2016, Alternatif Bank in 2017, 2018 and Halkbank in 2019.
(Akgül, 2021)	9 deposit banks traded on BIST	2016-2020	CoCoSo Method	The Akbank outperformed in all periods. ICBC Turkey Bank performed the worst in all periods.
(Yılmaz and Yakut, 2021)	22 banks traded on Borsa Istanbul (BIST)	2009-2018	TOPSIS and VIKOR Methods	The top three are Adabank, United Fund Bank, and Citibank. According to the VIKOR method, Alternatif Bank and Denizbank are ranked last.
(Bektaş, 2021)	Six participation banks in the Turkish banking sector	2018-2019	ENTROPI and MAIRCA Methods	In 2018, Ziraat Katılım, Türkiye Finans and Kuvet Türk, and in 2019 Kuveyt Türk, Ziraat Katılım and Vakıf Katılım banks performed the best.
(Kemal and Saygın, 2022)	Participation banks operating in Turkey	2011-2020	PROMETHEE Method	The banks with the highest performance were Kuveyt Türk, Turkey Finans, and Vakıf Katılım. The banks with the lowest performance were Albarak Turk, Bank Asya, and Emlak Katılım.
(Gülsün and Erdoğmuş, 2021)	The top eight banks in asset size ranking	2013-2018	Fuzzy AHP and Fuzzy TOPSIS methods	The banks with the highest performance were Ziraat Bank, İşbank, and Garanti Bank. The lowest performing banks are Akbank, VakıfBank and Finansbank.
(Şimşek, 2022)	The ten largest deposit banks in terms of asset size	2010-2020	AHP, SV and WEDBA methods	The banks with the highest performance are Ziraat Bank, Akbank and Garanti Bank. The banks with the lowest performance are VakıfBank, Denizbank, and Yapı Kredi.

(Bayram, 2022)	Seven conventional private equity banks and three private equity participation banks	2019-2021	SWARA-weighted CODAS Method	Garanti, Akbank and İş Bank outperformed other banks. Kuveyt Türk and Türkiye Finans have lower performance in 2021 compared to other years.
(Yurttadur and Taşcı, 2022)	All participation banks in Turkey	2019-2021	PIV Method	In 2019, Ziraat Katılım, Kuveyt Türk Katılım, Vakıf Katılım; in 2020, Vakıf Katılım, Ziraat Katılım, Kuveyt Türk Katılım; and in 2021, Vakıf Katılım, Kuveyt Türk Katılım and Türkiye Finans Katılım displayed the best financial performance.
(Gezen, 2021)	Nine deposit banks in Turkey	2016-2020	ENTROPİ and WASPAS Methods	It is concluded that the financial performance of private capital deposit banks in 2016, 2017 and 2018 and public capital deposit banks in 2019 and 2020 is higher.
(Medetoğlu and Saldanlı, 2022)	Eleven largest banks in terms of assets	2018-2020	Gray Relational Analysis Method	Akbank in 2018 and 2020 and ING Bank in 2019 showed the best financial performance, while Halkbank in 2018 and 2020 and Denizbank in 2019 showed the lowest performance.
(Demir, 2021)	Eight privately-owned commercial banks	2014-2019	SWARA-RAFSI Method	Akbank showed the best financial performance between 2014-2018 and Yapı Kredi in 2019. In the aforementioned years Şekerbank generally had the worst financial performance.
(Yetiz, 2021)	Five Participation Banks	2016-2019	TOPSIS Method	In 2016, Vakıf Katılım, Kuveyt Türk, Türkiye Finans and Türkiye Finans Katılım showed the highest financial performance in 2017, 2018 and 2019, respectively.
(Karaman and Kızkapan, 2022)	Top five banks with the largest assets	2020 quarterly period	TOPSIS and PROMETHEE Methods	In 2020, bank performances, with the exception of Ziraat Bank, saw a sharp decline in the second quarter, while VakıfBank showed a relative recovery in the third quarter, and the other banks sustained the same losses until the end of the year.
(Bayram, 2021)	Five participation banks operating in Turkey	2010-2019	EDAS Method	In 2019, Ziraat Katılım, Türkiye Finans and Vakıf Katılım ranked in the top three. In the same year, Albaraka Türk ranked last. Between 2010 and 2015 and in 2018, Albaraka Türk was the best performing participation bank.
(Yurttadur and Taşcı, 2023)	Six participation banks operating in Turkey	2021	CRITIC and MAIRCA Methods	As a result of the analysis, Kuveyt Türk Katılım ranks first in the financial performance ranking. Ziraat Katılım ranks last.
(Dalbudak Zorkirişçi and Rençber, 2023)	20 banks operating in Turkey with public, private or foreign capital	2009-2020	TOPSIS, PROMETHEE and COPRAS Methods	The top three public banks are Ziraat Bank, Halkbank, VakıfBank and Ziraat Bank. In addition, Akbank has always ranked among the top six among privately owned banks.
(Kaya, 2023)	Eleven public and private banks operating in Turkey	2019 – 2021	TOPSIS Method	In 2019 and 2021, Fibabank A. Ş. and in 2020, Turkish Bank A. Ş. showed the best financial performance. In 2019, Halkbank and VakıfBank showed the lowest financial performance; in 2020 and 2021, Şekerbank and VakıfBank showed the

lowest financial performance.

(Kaplan, Odabaş and Bozdoğan, 2023)	The seven largest banks by assets	2019-2021	ELECTRE and TOPSIS Methods	Privately owned banks' financial performance was more successful than that of state-owned banks.

As shown in Table 1, studies on banks' financial performance have been conducted in three categories. Some studies are specific to participation banks. Again, it is seen that some studies compare the financial performance of public and private banks. In the remaining studies, only banks of certain sizes were included in the study according to the criteria determined in terms of asset size. Recent studies show that financial performance is mostly evaluated through TOPSIS, PROMETHEE, and VIKOR methods. The MAIRCA method has not been used to evaluate the financial performance of the 11 deposit banks in terms of asset size. Therefore, this study differs from other studies.

3.Method, Analysis and Results

The aim of this study is to evaluate the financial performance of Turkish banks taken as a sample. Multi-Atributive Ideal-Real Comparative Analysis (MAIRCA), one of the MCDM methods, is used for financial performance measurements. MAIRCA method was introduced by Gigovic et al. The method aims to identify the gaps between ideal and empirical ratings and is based on the selection of the alternative with the least total gap value. The method in which the alternative with the lowest gap value will receive the best rank is an alternative to other MCDM methods (Gigović et al., 2016; Pamučar et al., 2017; Pamučar et al., 2018; Ayçin and Güçlü, 2020; Bektaş, 2021). The stages of the MAIRCA method are as follows:

Phase I: A decision matrix is created, and critical values are assigned to each alternative.

$$X = \begin{matrix} C_1 & C_2 & \dots & C_n \end{matrix} \begin{bmatrix} X_{11} & X_{12} & \cdots & X_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ X_{m1} & X_{m2} & \cdots & X_{mn} \end{bmatrix} \quad \textbf{(1)}$$

Phase II: By determining the priorities of the alternatives, the priority of alternative i was calculated form total alternatives. The lack of priority in the alternative selection process is an assumption of this method.

$$P_{Ai} = {}^{1}/_{m}; \qquad \sum_{1}^{m} P_{Ai} = 1. \qquad i = 1,2,\dots.,m \tag{2}$$

Phase III: The theoretical rating matrix is constructed as shown in Equation 3.

$$\begin{bmatrix} P_{A1} * W_1 & P_{A1} * W_2 & \dots & P_{A1} * W_m \\ P_{A2} * W_1 & P_{A2} * W_2 & \dots & P_{A2} * W_n \\ \vdots & \vdots & \ddots & \vdots \\ P_{Am} * W_1 & P_{Am} * W_2 & \cdots & P_{Am} * n \end{bmatrix} \tag{3}$$

Phase IV: The actual rating matrix is created by using the theoretical rating matrix and decision matrix. Programming is carried out for benefit and cost criteria. The matrix is calculated by Equations 4 and 5.

$$t_{rij} = t_{pij} * (x_{ij} - x_{\overline{ij}}/x_{ij}^{+} - x_{\overline{ij}}) \tag{4}$$

$$t_{rij} = t_{pij} * (x_{ij} - x_{ij}^{+}/x_{\overline{ij}} - x_{ij}^{+}) \tag{5}$$

Phase V: The total gap matrix is calculated by subtracting the actual rating matrix from the theoretical rating matrix. The matrix is shown in Equations 6 and 7, as follows:

$$G_{ij} = t_{Pij} - t_{rij} \tag{6}$$

$$G = T_P - T_r = \begin{bmatrix} g_{11} & g & \cdots & g_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ g_{m1} & g_{m2} & \cdots & g_{mn} \end{bmatrix} \tag{7}$$

Phase VI: In the last step of the method, the values of the criterion functions of the alternatives were calculated. The smallest of these values was considered the best alternative.

$$Q_i = \sum_{j=1}^{n} g_{ij}, \text{ i=1, 2,…, m} \tag{8}$$

The MAIRCA method stages were applied to the selected banks. As a sample, banks with total assets of 1% and above as a sector share in 2021 were selected. Data were obtained from The Banks Association of Turkey ("BAT"). The ratios of banks selected between 2014 and 2021 were obtained. The banks in the study and their codes and asset sizes in 2021 are listed in Table 2.

Table 2. Banks in the Study

Banks Name	Commercial Title	Code	2021 Total Assets %
Ziraat Bank	TC Ziraat Bankası A.Ş.	B1	16,1
Halkbank	Türkiye Halk Bankası A.Ş.	B2	10,6
VakıfBank	Türkiye Vakıflar Bankası T.A.O.	B3	11,9
Akbank	Akbank T.A.Ş.	B4	8,4
TEB	Türk Ekonomi Bankası A.Ş.	B5	2,3
İşbank	Türkiye İş Bankası A.Ş.	B6	10,9
Yapı Kredi	Yapı ve Kredi Bankası A.Ş.	B7	8,7
Denizbank	Denizbank A.Ş.	B8	3,6
ING	ING Bankası A.Ş.	B9	1,0
QNB	QNB Finansbank A.Ş.	B10	4,4
Garanti Bank	Türkiye Garanti Bankası A.Ş.	B11	8,9

Source: The Banks Association of Turkey (2023)

Table 2 shows that 11 banks with total assets of 1% or more in 2021 are included in the analysis. Banks are assigned codes for ease of presentation. The financial ratios, codes, weights, and period of the 11 banks taken as a sample are given in Table 3.

Table 3. Financial Ratios Used in the Study

Financial Ratios	Code	Weights	Period
Capital Adequacy Ratio	FİN1	%20	2014-2021
Shareholders' Equity / Total Assets	FİN2	%20	
Non-Performing Loans / Total Loans	FİN3	%5	
Liquid Assets / Total Assets	FİN4	%5	
Return on Average Assets	FİN5	%15	
Return on Average Equity	FİN6	%15	
Interest Income / Total Revenues	FİN7	%15	
Net Profit per Branch	FİN8	%5	

Source: The Banks Association of Turkey (2023)

Table 3 shows that 8 main financial ratios of banks are included in the analysis. Financial ratios used in this study:

- ⇒ Frequency of use in the literature,
- ⇒ Level of importance,
- ⇒ It has been determined on the grounds of being able to measure financial performance.

The financial ratios in Table 3 and their weights were used in the analysis. The stages of the MAIRCA method are presented in that order. For ease of presentation, the analysis results of the data from İş Bank, which showed the best performance in 2021, are shown in the study. At the end of the study, the results of the method applied to 11 banks were reported and the financial performance ranking of all banks was realized. The weighting of the data, which is one of the stages of the MAIRCA method, is presented in Table 4.

Table 4. Weighting of the Data

Years	FİN1	FİN2	FİN3	FİN4	FİN5	FİN6	FİN7	FİN8
2021	20,35954	9,372134	4,050993	22,23823	1,771542	17,42055	89,83277	11,27021
2020	18,68393	11,41289	5,573261	14,21756	1,282705	10,75508	89,98112	5,55087
2019	17,8652	12,5782	6,528572	14,14084	1,372063	11,1748	94,86978	4,773869
2018	16,48956	11,94095	4,301269	11,65237	1,738471	14,58636	94,51904	4,995635
2017	16,65634	11,89263	2,249919	24,90332	1,575096	13,42851	89,13795	3,891426
2016	15,17262	11,53979	2,420651	26,49574	1,600837	13,8279	84,74158	3,421547
2015	15,64656	11,61877	2,025298	27,42759	1,200683	10,05017	85,77689	2,238701
2014	16,02171	12,32739	1,5529	27,97981	1,509102	12,79043	80,90955	2,490753

Table 4 presents the weighting stages for the data. In addition to the weights in Table 3, equal weighting (1/8=0.125) was also used as per the assumption of the method. Following weighting of the data, a theoretical rating matrix was created, as shown in Table 5.

Table 5. Creation of Theoretical Rating Matrix

Years	FİN1	FİN2	FİN3	FİN4	FİN5	FİN6	FİN7	FİN8
2021	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625
2020	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625
2019	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625
2018	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625
2017	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625
2016	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625
2015	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625
2014	0,025	0,025	0,00625	0,00625	0,01875	0,01875	0,01875	0,00625

Table 5 presents the theoretical rating matrix. The calculation of the matrix takes place in Phase III of the study. After calculating the theoretical rating matrix, the actual rating matrix is calculated. The actual rating matrix is listed in Table 6.

Table 6. Creating the Actual Rating Matrix

Years	FİN1	FİN2	FİN3	FİN4	FİN5	FİN6	FİN7	FİN8
2021	0,025	0	0,003112	0,004052	0,01875	0,01875	0,011985	0,00625
2020	0,0169239	0,015913	0,0012	0,000982	0,002694	0,001793	0,012184	0,002292
2019	0,0129777	0,025	0	0,000953	0,005629	0,002861	0,01875	0,001754
2018	0,0063474	0,020031	0,002798	0	0,017664	0,01154	0,018279	0,001908
2017	0,0071512	0,019654	0,005374	0,005072	0,012298	0,008594	0,011052	0,001144
2016	0	0,016903	0,00516	0,005682	0,013143	0,00961	0,005147	0,000819
2015	0,0022843	0,017519	0,005657	0,006039	0	0	0,006537	0
2014	0,0040924	0,023044	0,00625	0,00625	0,01013	0,006971	0	0,000174

Max	20,35954	12,5782	6,528572	27,97981	1,771542	17,42055	94,86978	11,27021
Min	15,17262	9,372134	1,5529	11,65237	1,200683	10,05017	80,90955	2,238701

The actual rating matrix is available in Table 6. The matrix in the figure was constructed using the theoretical rating and decision matrix. After the actual rating matrix stage, the total gap matrix is calculated. The relevant matrix is available in Table 7.

Table 7. Creating the Total Gap Matrix

Years	FİN1	FİN2	FİN3	FİN4	FİN5	FİN6	FİN7	FİN8
2021	0	0,025	0,003138	0,002198	0	0	0,006765	0
2020	0,0080761	0,009087	0,00505	0,005268	0,016056	0,016957	0,006566	0,003958
2019	0,0120223	0	0,00625	0,005297	0,013121	0,015889	0	0,004496
2018	0,0186526	0,004969	0,003452	0,00625	0,001086	0,00721	0,000471	0,004342
2017	0,0178488	0,005346	0,000876	0,001178	0,006452	0,010156	0,007698	0,005106
2016	0,025	0,008097	0,00109	0,000568	0,005607	0,00914	0,013603	0,005431
2015	0,0227157	0,007481	0,000593	0,000211	0,01875	0,01875	0,012213	0,00625
2014	0,0209076	0,001956	0	0	0,00862	0,011779	0,01875	0,006076

The total gap matrix was obtained by subtracting the actual rating matrix from the theoretical rating matrix, as shown in Table 7. After the total gap matrix calculation stage, $Q_i$values were calculated. The calculation of the $Q_i$values is presented in Table 8.

Table 8. Q_i Values

Years	Q_i Values	Ranking
2021	0,0371009	1
2020	0,0710176	7
2019	0,0570753	4
2018	0,0464335	2
2017	0,0546604	3
2016	0,0685364	6
2015	0,0869645	8
2014	0,0680877	5

Table 8 shows the Q_i values of İş Bank. In this context, the most successful year of İş Bank in terms of financial performance is 2021, and the least successful year is 2015. The values for the other years are listed in the table. These values are calculated separately for the 11 banks taken as a sample. For ease of presentation within the scope of the study, the analysis results of İş Bank are shown and the Q_i values of 11 banks are reported in Table 9.

Table 9. 11 Bank's Q_i Values by Years

Years	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
2021	0,084954	0,081457	0,085356	0,051376	0,040275	0,037101	0,041934	0,05853	0,05429	0,04718	0,052531
2020	0,052858	0,059776	0,058273	0,057022	0,063975	0,071018	0,069531	0,069802	0,05676	0,052153	0,078859
2019	0,054006	0,083699	0,064828	0,053923	0,075217	0,057075	0,060835	0,080421	0,026148	0,053269	0,052116
2018	0,051224	0,072802	0,030288	0,054685	0,067772	0,046434	0,044066	0,018782	0,04818	0,047897	0,042491
2017	0,041688	0,039988	0,032022	0,041934	0,044459	0,05466	0,066852	0,013201	0,058146	0,056765	0,024723
2016	0,053273	0,062731	0,050687	0,079252	0,066614	0,068536	0,079696	0,038808	0,076614	0,073527	0,056397
2015	0,056637	0,047701	0,057747	0,096641	0,061837	0,086965	0,084504	0,064884	0,096516	0,081891	0,0835
2014	0,03123	0,046824	0,067545	0,07811	0,088665	0,068088	0,080749	0,093601	0,09682	0,053712	0,081708

Table 9 shows the Q_i values of the 11 banks sampled in the study. By examining the table, banks' financial performance rankings were determined. According to the MAIRCA method, the alternative with the smallest Q_i value shows the best performance. The current rankings in Table 9 are presented in Table 10.

Table 10. Performance Ranking of Banks

Years	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
2021	10	9	11	5	2	1	3	8	7	4	6
2020	2	6	5	4	7	10	8	9	3	1	11
2019	5	11	8	4	9	6	7	10	1	3	2
2018	8	11	2	9	10	5	4	1	7	6	3
2017	5	4	3	6	7	8	11	1	10	9	2
2016	3	5	2	10	6	7	11	1	9	8	4
2015	2	1	3	11	4	9	8	5	10	6	7
2014	1	2	4	6	9	5	7	10	11	3	8

Table 10 shows the financial performance rankings of banks. Table 10 shows that the bank with the best performance in 2021 is the İş Bank. In the same year, the bank with the worst performance is VakıfBank. Between 2016-2018, Denizbank has shown the best financial performance. Yapı Kredi had the worst financial performance between 2016-2017. It is among the most striking results that Halkbank exhibited the worst financial performance between 2018-2019. When the results of the analysis are evaluated, it can be stated that the ranking is based on the financial ratios selected in the study between 2014 and 2021. The results obtained are important for banks in terms of making future decisions by utilizing their past information.

4. Results

Banks are institutions that accept the amounts obtained from savers as deposits, provide loans to units in need of financing and fulfill the duties and functions specified in Law No. 5411. Banks are considered to be among the leading institutions of the financial sector and are involved as actors in almost all financial activities. Due to the tasks undertaken by banks, their financial success is important for both the sector and the national economy. When evaluated in terms of financial risk, which is accepted as one of the obstacles to financial success, it is seen that banks have achieved success both with indicators such as capital adequacy ratio and risk management systems. When both risk and success as well as indicators such as deposits, loans and shareholders' equity are evaluated together, it can be stated that the sector continues to develop. This development in the sector is determined and evaluated by testing the data of banks that meet the needs of economic units such as payments, collections and transfers for financial sustainability purposes.

Financial performance, which is used to evaluate the information obtained from the past information of the enterprises and to make decisions for the future, is an important guide for enterprises. When the relevant literature is examined, it is seen that MCDM methods are frequently used for financial performance measurement. The methods used in previous studies were TOPSIS, VIKOR, GIA, PROMETHEE, MAIRCA, COPRAS, and WASPAS. MCDM methods are performed based on periods, enterprises, or sectors. This study measures the financial performance of banks operating in the Turkish banking sector with total assets of 1% or more. The sample consisted of 11 deposit banks. Banks' financial ratios were obtained annually between 2014 and 2021. The ratios used are the capital adequacy ratio, equity/total assets, non-performing loans/total loans, liquid assets/total assets, return on average assets, return on average equity, interest income/total revenues, and net profit per branch. MAIRCA, which is an MCDM method, was used. As a result of the analyses, the performance ranking of 11 banks between 2014 and 2021 using 8 financial ratios and the findings obtained are reported. In 2019, İş Bank, in 2020 QNB and in 2021 ING Bank were the banks with the highest financial performance. In the same years, VakıfBank, Garanti Bank, Halkbank have the lowest performance. Between 2016-2018, Denizbank has shown the best financial performance. Yapı Kredi had the worst financial performance between 2016-2017.

When the findings are evaluated together, it is determined that public banks will show very poor financial performance in 2021. In contrast, public banks performed better between 2014-2017. The Covid-19 pandemic has been cited as the reason for the poor financial performance of public banks in recent years. Since 2020, the government officials' use of public banks to

subsidize trade disruptions may have led to this situation. Despite poor financial performance in recent years, Ziraat Bank and Vakıfbank have been found to have higher financial performance when all years are considered. The fact that there are other studies (Gülsün and Erdoğmuş, 2021; Karaman and Kızkapan, 2022; Şimşek, 2022; Yetiz and Kılıç, 2021) that find that Ziraat Bank in particular has a better financial performance when all banks are taken into account among public banks supports our study. The main reason for this situation may be that public banks do not have problems finding deposits such as private banks due to pensioners and public payments. Although there have been fluctuations among privately owned banks over the years, the average financial performance of QNB, Garanti Bank, and DenizBank has been higher. Yapıkredi, ING Bank, Akbank, and TEB had the worst financial performance, on average. Previous literature (Gülsün and Erdoğmuş, 2021; Şimşek, 2022; Yetiz and Kılıç, 2021), which was conducted in different years with different methods, partially supports our findings. Our study was able to provide different evaluations to the literature by analyzing the financial performance of banks with the highest asset size as of 2014-2021 using MAIRCA, a relatively new method. In addition, it is valuable to determine that the financial performance of state-owned banks is negatively affected during pandemic periods. Our study makes important contributions to investors by showing the effects of new pandemics that may occur in the future. Starting from 2019, the evaluation of the financial performance of banks with different MCDM methods is presented as a suggestion for future studies. In this way, it is possible to determine whether the impact of the pandemic on public banks has decreased.

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