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**Research Article**

## Financial Performance Analysis of Retail Trade Firms Registered in BIST with FUCOM Based VIKOR Method

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### ABSTRACT

Retailing is considered to be one of the sectors that have been growing in recent years and making significant contributions to the country's economy. In this sector where competition is intense, firms have to evaluate their financial performance in order to compete and see their current situation in the sector. In this study, it is aimed to identify the financial performances of firms in the BIST retail trade sector with FUCOM and VIKOR, which are multi criteria decision making (MCDM) methods. Financial ratios were used to determine the financial performances of the three firms with the most branches in the BIST retail trade sector between the years 2019-2021, and the weights of these financial ratios were determined by the FUCOM method. The performance ranking of retail trade firms was made using the VIKOR method using the weights obtained

### Keywords:

Multi-Criteria Decision Making, FUCOM, VIKOR



## 1. Introduction

Retailing is one of the sectors where competition is intense and developing due to changes in consumption concept and technological innovations. The retail trade sector has developed rapidly in recent years in our country as well as in the world. 723 thousand of the 3.1 million enterprises operating in Turkey operate in the retail trade sector. 710 billion TL of the 6.2 trillion TL turnover obtained from all sectors is obtained from the retail trade sector. Its share in the 3.1 trillion TL GDP is 368 billion TL. When the figures are analyzed, it is seen that the retail trade sector has a very important place in the Turkish economy in terms of sectoral size and growth performance (Ministry of Commerce, 2022).

The retail industry needs to reevaluate due to the complexity and cost of emerging new technologies. Technologies such as big data, automation, robotics and artificial intelligence are affecting retail firms more prominently. Similarly, it has been suggested that unexpected events such as the COVID 19 epidemic will trigger a decline and subsequent recovery in retail. It has been observed that panic purchases and online purchases have increased in the retail sector after the Covid 19 epidemic (Dyason, Fieger, Prayag, and Hall, 2022). Although affected by technology and the COVID epidemic, the retail industry has been developing in terms of turnover and number of stores in recent years. It can be said that the retail trade sector is one of the important sectors that can react immediately to the developments in the market.

It is necessary to determine the financial performance of the firms in the retail trade sector, and reveal the financial success of the firms. Financial performance is a measure of success that shows how well businesses use their assets. It is an indicator of how successful businesses are financially. Financial performance provides information about the general economic situation and welfare level of the enterprise. For this reason, financial performance is very important in determining the profitability and competitiveness of enterprises. Financial indicators are needed when analyzing financial performance. These indicators are derived from the company's financial statement items. Certain ratios are obtained by proportioning the balance sheet and income statement items to each other. Current ratio, acid test ratio, cash ratio, equity adequacy ratio, inventory turnover, asset turnover, net profit total assets ratio, etc. are some of the financial ratios used.

It is seen that MCDM methods are used in the financial performance analysis of enterprises in the literature. These methods enable rational decision making by considering a great deal of conflicting criteria. It helps to create consistent matrices and take more accurate decisions by reducing the complexity and errors in the solution of large size decision matrices (Paksoy, 2017). Therefore, it is appropriate to use MCDM methods in the financial performance analysis of enterprises where many performance indicators are used.

This study aims to demonstrate the applicability of MCDM methodologies in the evaluation of financial performance of enterprises operating in retail trade sector. FUCOM (Full Consistency Method) method was used to identify the importance weights of financial ratios used in performance evaluation. Financial performance ranking of BIST retail trade firms was obtained by VIKOR (Vise Kriterijumska Optimizacija I Kompromisno Resenje) method by using the weights of financial ratios.

## 2. Literature Review

In this study, firstly, a review was made on the use of FUCOM and VIKOR methods in the literature. Secondly, a literature review was conducted on the methods used in the financial performance analysis of retail trade firms. Durmić (2019) used the FUCOM approach to identify the weights for 3 criteria and 7 sub-criteria, which are effective in the selection of sustainable suppliers in his study. Fazlollahtabar et al. (2019) used FUCOM and WASPAS methods in forklift selection, which is an important issue in warehousing activities. The weights of the forklift selection criteria were obtained with the FUCOM method. The WASPAS method was used to evaluate and rank alternative forklifts. Badi and Abdulshahed (2019) used FUCOM and AHP methods together to rank airline firms in Libya. Stevic and Brkovic (2020) used FUCOM and MARCOS methods to identify human resources in the public transport firm. Ayçin and Aşan, (2021), used the FUCOM to identify the weights of the criteria in the selection of business intelligence applications. Ecer (2021) used the FUCOM method to weight the factors affecting the location selection of the wind farm. Demir (2021) used the fuzzy FUCOM method from determining the criteria used in the evaluation of e-government websites. Taşkent and Delice (2021) used the fuzzy FUCOM method while determining the criteria in the evaluation of the existing suppliers of a decorative stone supplier firm.

In literature, there are many studies used the VIKOR method to evaluate the businesses financial performance in different sectors in the BIST. Shaverdi et al. (2014) determined the financial performance analysis of firms in the petrochemical sector using the fuzzy AHP method. Bhandari et al. (2016) evaluated the financial performance of commercial banks with the AHP model. Yanik and Tamer (2017) used AHP, TOPSIS, ELECTRE and VIKOR methods in the financial performance analysis of BIST automotive firms. Karaoğlan and Şahin (2018) compared the financial performances of chemical firms in the BIST using AHP, VIKOR, TOPSIS, GRA and MOORA. Tufan and Kılıç (2019) evaluated the performance of BIST logistics firms using TOPSIS and VIKOR. Şahin and Sarı (2019) analyzed the financial performances of BIST manufacturing businesses using entropy, TOPSIS and VIKOR. Karakul and Özaydın (2019) determined the financial performance of energy and electricity firms traded on the BIST using TOPSIS and VIKOR methods. Mercan and Çetin (2020) evaluated the financial performance of electricity firms registered in the BIST using COPRAS and VIKOR methods. Işıldak (2020) used AHP and VIKOR methods in the financial performance analysis of its enterprises in the weaving sector in BIST. Yılmaz and Yakut (2021) used the entropy-based TOPSIS method to evaluate financial performance in the banking sector. Yazıcıoğlu and Yıldırım (2022) evaluated the performances of BIST construction firms using AHP and VIKOR methods.

A literature review was conducted on the financial performance analysis of BIST retail trade firms in terms of MCDM methods. Temür et al. (2017) used the TOPSIS method to analyze the financial performance of ten firms traded on the BIST. Row et al. (2020) analyzed the performance analysis of eight firms in the BIST retail trade sector using the TOPSIS method. Yıldırım and Meydan (2021) used the heuristic fuzzy EDAS method to analyze the financial performance of seven retail firms traded on the BIST. İtik and Sel (2021) used CILOS and TOPSIS methods together to identify the financial performance of nine firms traded in the retail sector on the BIST. Yıldırım (2021)

analyzed the financial performance of retail firms traded on the BIST using the Pythagorean Fuzzy TOPSIS and Entropy methods. Budak and Sakarya (2022) analyzed the financial performance of five firms in the BIST retail trade sector using the entropy-based TOPSIS method. Özbek (2016) analyzed the financial performance of a retail store between 2008 and 2015 with the ELECTRE III method. Ceyhan and Karapolat (2022) evaluated the financial performance of five retail trade firms in the BIST using the COPRAS method. Gül and Erdem (2022) performed the financial analysis of four retail firms in the BIST using entropy and TOPSIS methods.

The FUCOM approach is utilized in many contexts for criterion weighting, according to an analysis of the literature. However, no study is found in which the FUCOM method was used for criterion weighting while evaluating financial performance. It has been observed that TOPSIS, EDAS, COPRAS and ELECTRE methods are used when evaluating the performances of BIST retail trade firms. However, there is no study evaluating financial performance with the VIKOR method. For this reason, it is thought that using the FUCOM-based VIKOR approach to assess the financial performance of BIST retail trade enterprises will be beneficial to the literature.

### 3. Methodology

In the study, the FUCOM method will be used to weight the financial ratios to be used in the performance analysis, and the VIKOR method will be used for the performance ranking of retail trade firms.

#### 3.1. FUCOM Method

FUCOM (Full Consistency Method) method was developed by Pamucar et al. (2018) is a subjective criterion weighting method. FUCOM determines criterion weights through pairwise comparisons.

The FUCOM method allows weight calculation by making fewer pairwise comparisons compared to the AHP method. The FUCOM method aims to minimize the inconsistency that may occur in pairwise comparisons while calculating the criterion weight with  $n-1$  pairwise comparisons. The advantages of the FUCOM method are that it is not a very complex method and it can be used in situations where there is more than one decision maker (Ayçin and Aşan, 2021). While determining the weights in the FUCOM method, the deviation from full consistency is found (Pamučar, Stević, & Sremac, 2018).

The application steps of the FUCOM method are as follows (Pamučar, Stević & Sremac, 2018);

**Step 1.** The criteria are ranked from the most important to the least important. Thus, as seen in Equation (1), a ranking of criteria is obtained according to the expected values of the weights.  $k$  represents the degree of the observed criteria.

$$C_{j(1)} > C_{j(2)} > \dots > C_{j(k)} \quad (1)$$

**Step 2.** The comparative priority vector of the criteria is obtained by calculating the comparative priorities ( $k/k+1$ ) of the criteria whose importance rankings are calculated. The evaluation criteria's comparative priority vector is the same as in Equation 2.

$$\varphi = (\phi_{1/2}, \phi_{2/3}, \phi_{3/4}, \dots, \phi_{k/k+1}) \tag{2}$$

**Step 3.** The final criterion weight values  $(w_1, w_2, \dots, w_n)^T$  are computed. There are two conditions that the weights' ultimate values must meet.

**Condition 1.** The comparative priority values of the criterion are the same as the weights' ratio.

$$\frac{W_k}{W_{k+1}} = \phi_{k/(k+1)} \tag{3}$$

**Condition 2.** The final values of the weights must satisfy mathematical transitivity.

The equation  $\phi_{k/(k+1)} \otimes \phi_{(k+1)/(k+2)} = \phi_{k/(k+2)}$  must be ensured. Similarly, from the equation  $\phi_{k/(k+1)} = \frac{W_k}{W_{k+1}}$  and  $\phi_{(k+1)/(k+2)} = \frac{W_{k+1}}{W_{k+2}}$ ,  $\frac{W_k}{W_{k+1}} \otimes \frac{W_{k+1}}{W_{k+2}} = \frac{W_k}{W_{k+2}}$  equation is obtained. The formula in Equation 4 is used for the values of the weights of the criteria.

$$\frac{W_k}{W_{k+2}} = \phi_{k/(k+1)} \otimes \phi_{(k+1)/(k+2)} \tag{4}$$

When these two conditions are satisfied; minimum deviation from full consistency (DFC)  $\chi$  is obtained. The linear programming model in Equation 5 is solved to produce the final weights for the criteria.

Min  $\chi$

s.t.

$$\left| \frac{w_j(k)}{w_j(k+1)} - \phi_{k/(k+1)} \right| \leq \chi, \forall j$$

$$\left| \frac{w_j(k)}{w_j(k+2)} - \phi_{k/(k+1)} \otimes \phi_{(k+1)/(k+2)} \right| \leq \chi, \forall j$$

$$\sum_{j=1}^n w_j = 1, \forall j$$

$$W_j \geq 0, \forall j \tag{5}$$

### 3.2. VIKOR Method

The VIKOR (Vise Kriterijumska Optimizacija I Kompromisno Resenje) method was developed by Oprionic and Tzeng in 2004. When decision-makers are unable to properly express their choices, it is an effective solution (Oprionic & Tzeng, 2007). The VIKOR focuses on ranking multiple alternatives when conflicting criteria are involved. It allows for sorting according to how close a problem is to the ideal solution. (Oprionic & Tzeng, 2004). The VIKOR is suitable for a limited set of alternatives to be ranked with certain criteria. It is accepted the VIKOR's primary goal is to determine the conciliatory solution that will maximize the group benefit and minimize individual regret.

Application steps of VIKOR method are as follows (Oprionic and Tzeng, 2004);

**Step 1.** Find  $f_i^*$  and  $f_i^-$  values for all criteria. If  $i$  is the benefit criterion;

$$f_i^* = \max_j f_{ij} \qquad f_i^- = \min_j f_{ij} \qquad i=1,2,\dots,n \tag{6}$$

**Step 2.**  $S_j$  and  $R_j$  values are obtained with Equations 7 and 8 for  $j= 1,2, \dots, n$ . The  $w_i$  indicates the weights that show the relative importance of the criteria in the formula.

$$S_j = \sum_{i=1}^n w_i (f_i^* - f_{ij}) / (f_i^* - f_i^-) \quad (7)$$

$$R_j = \max_i [w_i (f_i^* - f_{ij}) / (f_i^* - f_i^-)] \quad (8)$$

**Step 3.**  $Q_j$  values are calculated for all  $j= 1,2,\dots,j$ .

$$Q_j = v (S_j - S^*) / (S^- - S^*) + (1-v) (R_j - R^*) / (R^- - R^*) \quad (9)$$

$$S^* = \min S_j \quad S^- = \max S_j \quad R^* = \min R_j \quad R^- = \max R_j \quad (10)$$

The "v" value is assumed to be 0.5.

**Step 4.** In order to create ranking lists for each alternative,  $S$ ,  $R$ , and  $Q$  values are used. The best alternative is the one with the lowest  $Q_j$  value.

**Step 5.** When conditions are provided, alternative ranking according to minimum  $Q$  is found as a compromise solution.

**C1.** Acceptable advantage: The condition in which the difference between the two best and near-best alternatives is investigated.

$$Q(a'') - Q(a') \geq DQ \quad (11)$$

$a''$  refers to the second alternative in ordering according to the value of  $Q$ .  $j$  is calculated with  $DQ = 1/(j-1)$  to represent the variety of alternatives. The large difference between the alternatives makes it easier to choose the best alternative.

**C2.** Acceptable stability in decision making: A condition that must be satisfied in order to assert that the compromise solution is stable in the ranking of alternatives.

Alternative  $a'$  is the best alternative ranked by  $S$  and/or  $R$  values. If one of these conditions is not met, a compromise solution set is suggested. The compromise solution set is proposed, which consists of:

- Alternatives  $a'$  and  $a''$  only if C2 is not met; or
- Alternatives  $a', a'', \dots, a^{(M)}$  if C1 is not met;  $a^{(M)}$  is defined by the relationship

$$Q(a^{(M)}) - Q(a') < DQ \quad (12)$$

For maximum  $M$ . The alternative with the lowest  $Q$  value is the ideal choice. The compromise ranking list of the alternatives and the advantage ratio are considered as the compromise solution.

## 4. Findings and Discussion

The aim of the study is to analyze the financial performance of firms in the retail trade sector traded on the BIST between 2019-2022. In this context, BİMAS (BİM United Mağazalar A.Ş., MGROS (MİGROS Ticaret A.Ş.) and SOKM (ŞOK Marketler Ticaret A.Ş.) included in the BIST retail trade sector and have the most branches are the firms whose financial performance will be measured. The financial information of these

firms for the years 2019-2022 was obtained from the financial statement data of BIST and Public Disclosure Platform (KAP).

The financial ratios to be used in the financial performance evaluation of retail trade firms traded on the BIST were selected from among the financial performance indicators used in the literature, taking the opinions of experts who made financial analysis. Financial performance ratios have been chosen to reflect the firm's activities, financial condition and profitability. Among the liquidity, financial structure, activity and profitability ratios, seven financial ratios were selected to be used in financial performance analysis. These ratios and the formulas used to calculate the ratios are shown in Table 1.

Financial Ratios	Formulas
Current Rate (FR1)	Current Assets / Short-Term Liabilities
Current Assets/Total Assets rate (FR2)	Current Assets / Total Assets
Leverage Ratio (FR3)	Short-Term Liabilities + Long-Term Liabilities / Total Assets
Inventory Turnover (FR4)	Cost of goods sold / Average Stock
Equity Turnover Rate (FR5)	Net Sales / Average Equity
Net Profit Margin (FR6)	Net Profit / Net Sales
Cost of goods sold / Net Sales (FR7)	Cost of goods sold / Net Sales

Table 1. Financial Ratios Used in Performance Analysis

The weights of the ratios to be used in the firms' financial performance analysis will be computed using FUCOM.

#### 4.1. Determining the Weights of Financial Ratios with the FUCOM Method

While determining the weights according to the FUCOM method, each financial ratio should be ranked in order of importance. The order of importance of financial ratios and their relative importance scores were determined based on experts opinions. The order of financial ratios from most important to least important is FR6 > FR1 > FR3 > FR2 > FR4 > FR7 > FR5. After ordering of importance, financial ratios were compared on a scale of 1-9. Comparisons are made according to the most significant financial ratio. The importance scores given to financial ratios by an expert working in the field of finance are as in Table 2.

FR6	FR1	FR3	FR2	FR4	FR7	FR5
1	2	2,5	3	4	5	5,5

Table 2. Importance Scores of Financial Ratios

Weights of financial ratios calculated after pairwise comparisons,  $w_6/w_1 = 2$ ,  $w_1/w_3 = 1,25$ ,  $w_3/w_2 = 1,2$ ,  $w_2/w_4 = 1,33$ ,  $w_4/w_7 = 1,25$ ,  $w_7/w_5 = 1,1$  was calculated as. The final values of the weights should ensure mathematical transitivity. Accordingly, the value of the net profit margin according to the leverage ratio; It is calculated as  $w_6/w_3 = w_6/w_1 \otimes w_1/w_3 = 2 \times 1,25 = 2,5$ . When similar calculations are made for other ratios, the weights are;  $w_6/w_3 = 2,5$ ,  $w_1/w_2 = 1,5$ ,  $w_3/w_4 = 1,59$ ,  $w_2/w_7 = 1,66$ ,  $w_4/w_5 = 1,37$ .

The linear programming model to be used to calculate the weights of financial ratios is as follows;

Min  $\chi$

s.t.

$$\left| \frac{w_6}{w_1} - 2 \right| \leq \chi \quad \left| \frac{w_1}{w_3} - 1,25 \right| \leq \chi \quad \left| \frac{w_3}{w_2} - 1,2 \right| \leq \chi \quad \left| \frac{w_2}{w_4} - 1,33 \right| \leq \chi$$

$$\left| \frac{w_4}{w_7} - 1,25 \right| \leq \chi \quad \left| \frac{w_7}{w_5} - 1,1 \right| \leq \chi \quad \left| \frac{w_6}{w_3} - 2,5 \right| \leq \chi \quad \left| \frac{w_1}{w_2} - 1,5 \right| \leq \chi$$

$$\left| \frac{w_3}{w_4} - 1,59 \right| \leq \chi \quad \left| \frac{w_2}{w_7} - 1,66 \right| \leq \chi \quad \left| \frac{w_4}{w_5} - 1,37 \right| \leq \chi$$

$$\sum_{j=1}^7 w_j = 1$$

$$w_j \geq 0, \forall j$$

Linear programming model is solved by coding with Python programming language. The weights of the financial ratios obtained by the analysis of the linear programming model are as in Table 3.

Financial Ratios	Weights
Current Rate (FR1)	0,35
Current Assets/Total Assets rate (FR2)	0,17
Leverage Ratio (FR3)	0,14
Inventory Turnover (FR4)	0,12
Equity Turnover Rate (FR5)	0,09
Net Profit Margin (FR6)	0,07
Cost of goods sold / Net Sales (FR7)	0,06

**Table 3.** Weights of Financial Ratios

As seen in Table 3, net profit margin, which is the most important financial ratio, has a weight of 35% among other ratios. The current ratio is the second most important ratio with 17% weight. The leverage ratio is in the third place with 14% weight. Current assets/assets ratio is in fourth place with 12% weight. The current asset/asset ratio is followed by the inventory turnover ratio with a weight of 9%. SMM / Net sales ratio ranks sixth with a weight of 7%. The last financial ratio with 6% weight is equity turnover.

## 4.2. Financial Performance Ranking of BIST Retail Trade Firms with VIKOR Method

First of all, a decision matrix was created in order to determine the performance ranking of the selected retail trade firms by the VIKOR method. In the decision matrix, the rows consist of retail trade firms and the columns are financial ratios. First of all, a performance analysis of retail trade firms for 2019 was made. The decision matrix created for 2019 is as in Table 4. Table 4 shows the weight values of the financial ratios calculated with the FUCOM method.

	FR1	FR2	FR3	FR4	FR5	FR6	FR7
<b>BİM</b>	0,83	0,40	0,73	14,87	9,49	30,46	0,83
<b>MİGROS</b>	0,7	0,36	0,98	6,67	0,07	-21,51	0,74
<b>ŞOK</b>	0,43	0,33	1	11,19	-0,59	-18,58	0,77
<b>Weights</b>	0,17	0,12	0,14	0,09	0,06	0,35	0,07

**Table 4.** Financial Ratio Values for 2019



After the decision matrix was obtained,  $f_i^*$  and  $f_i^-$  values were found. These values are as in Table 5.

	FR1	FR2	FR3	FR4	FR5	FR6	FR7
$f_i^*$	0,83	0,40	0,73	6,67	9,49	30,46	0,83
$f_i^-$	0,43	0,33	1	14,87	-0,59	-21,51	0,77

Table 5.  $f_i^*$  and  $f_i^-$  Values

$S_j$  and  $R_j$  values were calculated for each retail firm by using the weights and  $f_i^*$  and  $f_i^-$  values of financial ratios. Table 6 provides the values for  $S_j$  and  $R_j$ .

	FR1	FR2	FR3	FR4	FR5	FR6	FR7	$S_j$	$R_j$
BİM	0,00	0,00	0,00	0,09	0,00	0,00	0,00	0,09	0,09
MİGROS	0,06	0,06	0,13	0,00	0,06	0,35	0,11	0,76	0,35
ŞOK	0,17	0,12	0,14	0,05	0,06	0,33	0,07	0,94	0,33

Table 6.  $S_j$  and  $R_j$  Values

In order to rank the performance of retail firms, the  $Q_j$  value must be calculated.  $S^*$ ,  $R^*$ ,  $S^-$ ,  $R^-$  values were obtained for the calculation of  $Q_i$ .  $Q_j$  values were calculated with the help of the formula in Equation 9 and shown in Table 7. In the analysis, the value of "v" was taken as 0.5.

	$S_j$	$R_j$	$Q_j$
BİM	0,09	0,09	0
MİGROS	0,76	0,35	0,88
ŞOK	0,94	0,33	0,96
$S^*, R^*$	0,09	0,09	
$S^-, R^-$	0,94	0,35	

Table 7.  $Q_i$  Values

Retail firms are ranked in three different ways with respect to their  $S$ ,  $R$  and  $Q$  values. The ranking alternatives of retail firms are given in Table 8.

	$S_j$	Ranking	$R_j$	Ranking	$Q_j$	Ranking
BİM	0,09	1	0,09	1	0	1
MİGROS	0,76	2	0,35	3	0,88	2
ŞOK	0,94	3	0,33	2	0,96	3

Table 8. Performance Ranking of Retail Firms

When Table 8 is examined, the performance ranking of the firms according to their  $Q_j$  values is realized as BİM, MİGROS and ŞOK. The ranking did not change according to the  $S_j$  values either. It is seen that the performance ranking according to the  $R_j$  values is BİM, ŞOK and MİGROS. According to all three rankings; it is seen that BİM firm has the best performance. However, two conditions must be met for this. In the acceptable superiority condition, the condition in Equation 11 must be satisfied. The condition for  $Q(A'') - Q(A') \geq DQ$  must be satisfied. In cases where the number of alternatives is less than four, the  $DQ$  value is taken as 0.25 (Tzeng, Lin, & Opricovic, 2005). The difference in  $Q_j$  values is greater than 0.25. The first condition is satisfied. In the acceptable stability condition, the firm must be the first in either of the values of  $S_j$ , which gives the sum of the distance of the firms to the best value, and  $R_j$ , which gives the distance to the worst value. It is seen that it ranks first in  $S_j$  and  $R_j$  values. The

second condition is also satisfied. It can be said that BİM firm has the best financial performance for 2019.

The performance of retail trade firms for the years 2020-2021 was evaluated with the VIKOR and the results are displayed in Table 9.

	2019				2020				2021			
	S <sub>j</sub>	R <sub>j</sub>	Q <sub>j</sub>	Rank	S <sub>j</sub>	R <sub>j</sub>	Q <sub>j</sub>	Rank	S <sub>j</sub>	R <sub>j</sub>	Q <sub>j</sub>	Rank
BİM	0,09	0,09	0	1	0,45	0,17	0,04	2	0,59	0,35	1	3
MİGROS	0,76	0,35	0,88	2	0,67	0,35	0,99	3	0,39	0,14	0	1
ŞOK	0,94	0,33	0,96	3	0,43	0,17	0,17	1	0,55	0,17	0,47	2

**Table 9.** Performance Values of Retail Trade Firms Between 2019-2021

When Table 9 is examined, the performance ranking of retail firms according to Q<sub>j</sub> values in 2020 was realized as ŞOK, BİM and MİGROS. In order to say that the firm with the best financial performance is ŞOK, acceptable superiority and acceptable stability conditions are examined. The difference between the Q<sub>j</sub> values of the ŞOK and BİM firms with the best performance value is less than 0.25 ( $Q(A'') - Q(A') = 0.13 \leq 0.25$ ). In this case, the difference between the Q<sub>j</sub> value of the next firm in the ranking and the Q<sub>j</sub> value of the first firm is looked at (Öztürk and Kaya, 2020). Q<sub>j</sub> values Migros and ŞOK firms were taken as the difference and it was checked whether they satisfied the condition or not. ( $Q(A''') - Q(A') = 0.82 \geq 0.25$ ) According to the calculations, it was seen that the acceptable superiority condition was satisfied. The ŞOK firm took the first place in the R<sub>j</sub> value ranking and it was seen that the acceptable stability condition was also satisfied. In this case, it is concluded that in the financial performance ranking for 2020, ŞOK and BİM have a compromise solution together. It cannot be said that the firm with the best financial performance for 2020 is only ŞOK firm. ŞOK and BİM firms are considered as the firms with the best financial performance.

Looking at the performance ranking of retail trade firms in 2021, it is seen that MİGROS has the best performance. In terms of financial performance, ŞOK ranks second and BİM ranks third. It has been observed that the acceptable superiority condition ( $Q(A'') - Q(A') = 0.47 \geq 0.25$ ) is satisfied for the validity of the financial ranking made according to the Q<sub>j</sub> values. Since both conditions are satisfied, it is seen that the firm with the best financial performance for 2021 is MİGROS.

## 5. Conclusion

The retail sector is considered to be one of the sectors that has grown rapidly in recent years and has a significant place in the country's economy. By evaluating the financial status of firms operating in the retail trade sector, important data for the sector are obtained and various growth strategies can be developed by using these data. Therefore, in this study, it is aimed to evaluate the financial performances of the three firms in the BIST retail trade sector, which have the most branches. FUCOM and VIKOR methods were used to evaluate financial performance. To evaluate the performance, seven financial ratios were determined that allow the analysis of the situation of the firms. The weights of the financial ratios were identified by the FUCOM method, which analyzes using the linear programming model. The performance ranking of retail trade firms is made with the VIKOR method, which allows to determine if there is a compromise solution while listing the alternatives.

According to the weighting made with FUCOM; it has been determined that the most important financial ratios are net profit margin, current ratio and leverage ratio. It has been concluded that these three ratios, which provide information about the liquid structure, profitability and financial structure of the firms, are more important. The financial performances of retail trade firms between the years 2019-2021 were evaluated with the VIKOR. The ranking of the firms with the best performance is changed every year. According to the results of the analysis, BİM in 2019, ŞOK and BİM in 2020, and ŞOK in 2021 were determined as the firms with the best financial performance. While BİM was the firm with the best performance in 2019, it shared the best performance as an alternative to ŞOK firm in 2020, and became the firm with the worst performance in 2021. MİGROS ranked second in 2019, last in 2020, and had the best performance in 2021. While ŞOK was in the last place in the ranking in 2019, it became one of the two firms with the best performance in 2020, and took the second place in the performance ranking in 2021.

It can be said that the COVID 19 pandemic has an effect on the variability in the financial performance of the firms. The fact that closures occurred in certain periods during the pandemic process greatly affected retail trade firms. Closure and social distancing practices have led consumers to frequently use e-commerce applications. This has affected the turnover and profitability of retail trade firms.

The similarity between the performance rankings obtained by the FUCOM and VIKOR methods and the situation of the companies in the market shows that the methods can be easily used in performance analysis. In addition, the VIKOR method allows to make a performance analysis of firms by taking into account many financial ratios. It can be defined as a method that measures performance by taking into account the effect of many financial ratios and provides results close to the situation in the market. The results obtained in this study will inform the managers of the firms in the retail sector about their financial performance. However, it will provide financial investors with information about the industry. Since the results obtained show the financial status of the firms, they will give an idea about which of the papers traded in the BIST retail trade sector should invest. With these aspects, this study will contribute to the literature and will be useful.

The first limitation of the study is the inclusion of three retail trade companies traded on the BIST in the analysis. Performance evaluation for the years 2019-2021 can be considered as the second limitation of the study. In future studies, new evaluations can be made for the retail trade sector by using different firms in the retail sector and different financial ratios. By changing the MCDM methods used, current methods or fuzzy methods can be included in the performance analysis. Financial performances of retail trade firms obtained can be compared with different methods.

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