MULTI-CRITERIA ANALYSIS OF BANKS' PERFORMANCES

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Abstract

Financial performance evaluation of firms is one of the multi-criteria decision making (MCDM) problem. The aim of this study is to evaluate and rank banking firms which are traded in ISE with respect to overall financial performances. One of the promising methods VIKOR (Vise Kriterijumska Optimizacija I Kompromisno Resenje) which is a compromise ranking method used as a multi-criteria decision making (MCDM) techniques in this study. By the application of VIKOR banks are ranked with respect to their overall performances.

Key Words: *MCDM, VIKOR Method, Banking Sector*

JEL Classification: C65, G30

1. INTRODUCTION

In the literature there are several studies to measure bank's performances in Turkey. For example, the performance characteristics of Turkish private and state-owned commercial banks for the 1986– 1990 period was investigated by Aydogan and Booth (1996). Mercan et al (2003) used financial ratios in DEA (data envelopment analysis) to assess the 1989–99 relative financial performance of Turkish banks. Özkan-Güney and Tektaş (2006) assessed the technical efficiency of nonpublic commercial banks between 1990 and 2001 following the DEA model. Ertuğrul and Karakaşoğlu (2008) evaluated and ranking branches of one bank with the Vikor method. Seçme et al. (2009), used Fuzzy AHP and TOPSIS methods to evaluate the largest five commercial banks of Turkish Banking Sector. They used both financial and non-financial indicators in their analysis.

In this study VIKOR method (the compromise ranking method) is used for evaluating the performances of the banks which are traded in ISE (Istanbul Stock Exchange). The financial ratios which published in financial statements of 2008 and their calculated weights by Seçme et al. 2009 are used for make the comparison with VIKOR method.

2. VIKOR Method

The VIKOR Method was introduced as one applicable technique to implement within MCDM (Opricovic, 1998). The VIKOR method focuses on ranking and selecting from a set of alternatives, and determines compromise solutions for a problem with conflicting criteria, which can help the decision makers to reach a final decision (Opricovic and Tzeng, 2007).

The steps of the VIKOR Method are explained in detail below (Opricoviz and Tzeng, 2004; Opricoviz and Tzeng, 2007):

Step 1. Determination the best f_i^* and the worst f_i^- values of all criterion functions, i=1,2,…,n. If the ith function represents a benefit then

$$f_i^* = \max_j f_{ij} \qquad f_i^- = \min_j f_{ij} \quad \text{if the i-th function represents a benefit;} \qquad (1)$$

$$f_i^* = \min_j x\, f_{ij} \qquad f_i^- = \max_j f_{ij} \quad \text{if the i-th function represents a cost.}$$

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Step 2. Computation the values S_j and R_j, j=1,2,…,J

$$S_j = \sum_{i=1}^{n} w_i (f_i^* - f_{ij})/(f_i^* - f_i^-), \qquad (2)$$

$$R_j = \max_i [w_i (f_i^* - f_{ij})/(f_i^* - f_i^-)], \qquad (3)$$

Here w_i are the weights of criteria, expressing their relative importance. S

Step 3. Computation the values Q_j, j=1, 2… J

$$Q_j = v(S_j - S^*)/(S^- - S^*) + (1-v)(R_j - R^*)/(R^- - R^*) \qquad (4)$$

Where

$$S^* = \min_j S_j, \qquad S^- = \max_j S_j,$$

$$R^* = \min_j R_j, \qquad R^- = \max_j R_j,$$

v is introduced as weight of the strategy of "the majority of criteria" (or "the maximum group utility"), here $v = 0.5$.

Step 4. Ranking the alternatives, sorting by the values S, R and Q, The results are three ranking lists.

Step 5. Proposing as a compromise solution the alternative (a') which is ranked the best by the measure Q (minimum) if the following two conditions are satisfied:

C1: "Acceptable advantage":

$Q(a'') - Q(a') \geq DQ$ Where a'' is the alternative $DQ = 1/(J-1)$; J is the number of alternatives.

C2. "Acceptable Stability in decision making": The alternative a' must also be the best ranked by *S* or/and *R*. This compromise solution is stable within a decision making process, which could be the strategy of maximum group utility (when $v > 0.5$ is needed), or "by consensus" $v \approx 0.5$, or "with veto"($v < 0.5$). Here, *v* is the weight of decision making strategy of maximum group utility.

3. APPLICATION

It has been argued that the measurement of bank's performances is based on several criteria and those criteria are quantitative and qualitative. Quantitative criteria are financial ratios which are selected from annual reports of banks (Rakocevic and Dragasevic, 2009). This study rates the banks according to following dimensions with some financial ratios based on the year 2008: Capital adequacy, Assets quality, Profitability, Income and Expenditure Structure, Group and Sectoral Shares. In this study the relative weights which calculated with Fuzzy AHP method by Seçme et al. (2009) are used (Table 1). Criteria's weights are normalized and got the final weights.

Table 1: The Relative Weights of Financial Criteria and Sub-criteria which are Used in Evaluation

Main criteria and weights	Sub criteria and weights	Final weight	Main criteria and weights	Sub criteria and weights	Final weight
Capital Adequacy (0.189)	E/(ARW + MRBA) (0.546)	0,1086	Profitability (0.161)	NP(L)P/TA (0.684)	0,1159
	E/TA (0.161)	0,0320		NP(L)P/E (0.316)	0,0536
	(E/FA)/TA (0.293)	0,0583	Income Expenditure Structure (0.109)	NET-II/TA (0.122)	0,0140
Assets Quality (0.128)	SP(net)/TA (0.081)	0,0109		NET-II/TOP (0.232)	0,0266
	TC/TA (0.115)	0,0155		NON-II/TA (0.276)	0,0317
	NAL (net)/TC (0.125)	0,0168		NON-IE/TOI (0.248)	0,0285
	SRL/NAL (0.125)	0,0168		PCOR/TA (0.122)	0,0140
	FA/TA (0.071)	0,0096	Group Share (0.109)	TA (0.207)	0,0238
	FCA/TA (0.083)	0,0112		TC (0.450)	0,0516
	FCL/TL (0.107)	0,0144		TD (0.343)	0,0394
	NRP/E (0.143)	0,0193	Sectoral Share (0.128)	TA (0.207)	0,0279
	(NBP+NOPB)/E (0.150)	0,0202		TC (0.450)	0,0606
Liquidity (0.176)	LA/TA (0.316)	0,0419		TD (0.343)	0,0462
	LA/STL (0.684)	0,0907			

(Capital adequacy: E/(ARW+MRBA): equities/(assets relative weights + market risk basis of amount), E/TA: equities/total assets, (E-FA)/TA: (equities – fixed assets)/total assets,

Assets Quality: SP (net)/TA: securities portfolio (net)/total assets, TC/TA: Total credits/total assets, NAL (net)/TC: non-accruing loans (net)/total credits, SRL/NAL: specific reserve for loans/non-accruing loans, FA/TA: fixed assets/total assets, FCA/TA: foreign currency assets/total assets, FCL/TL: foreign currency liabilities/total liabilities, NRP/E: net result position/equities, (NBP+NOBP)/E: (net balance-sheet position + net off-balance-sheet position)/equities,
Liquidity: LA/TA: liquid assets/total assets, LA/STL: liquid assets/short terms liabilities,
Profitability: NP (L)P/TA: net profit (loss) for the period/total assets, NP(L)P/E: net profit (loss) for the period/equities,
Income expenditure structure: Net-II/TA: net interest income/total assets, Net-II/TOP: net interest income/total operating profits, non-II/TA: non-interest incomes/total assets, non-IE/TOI: non-interest expenses/total operating incomes, PCOR/TA: provision for credit and other receivables/total assets,
Group share and sectoral share: TA: total assets, TC: total credits, TD: total deposits) (Seçme et al., 2009)

Thirteen Turkish banks which are traded in ISE are included in this study. They are Akbank, Alternatif Bank, Denizbank, Ekonomi Bank, Finans Bank, Fortis Bank, Garanti Bank, Halk Bank, İşbank, Şekerbank, Tekstil Bank, Vakıflar Bank and Yapı ve Kredi Bank. Although Kalkınma Bank and Turk Sınai Kalkınma Bank are traded in ISE they aren't included this study. For the purposes of deposit banks Kalkınma Bank and Turk Sınai Kalkınma Bank are dissonant.

Total 27 financial ratios of these 13 banks have gathered from the publications of the Bank Association of Turkey (www.tbb.org.tr).

Table 2: S, R and Q scores and ranks of the Banks

Banks	S	Rank	R	Rank	Q	Rank
Akbank	**0,288**	**1**	0,070	4	0,128	2
Alternatif Bank	0,704	13	0,109	12	0,941	12
Denizbank	0,547	7	0,055	2	0,311	4
Ekonomi Bank	0,597	10	0,065	3	0,457	5
Finans Bank	0,568	8	0,071	5	0,472	6
Fortis Bank	0,574	9	0,091	8	0,640	10
Garanti Bank	0,318	2	**0,055**	**1**	**0,039**	**1**
Halk Bank	0,505	5	0,099	10	0,619	8
İşbank	0,346	3	0,080	6	0,277	3
Şekerbank	0,621	11	0,093	9	0,715	11
Tekstil Bank	0,671	12	0,116	13	0,960	13
Vakıflar Bank	0,484	4	0,103	11	0,635	9
Yapı ve Kredi Bank	0,535	6	0,091	7	0,592	7

Firstly the best f_i^* and the worst f_i^- values of all criterion functions are determinate from equation (1). After that with using the equation (2), (3) and (4) S_j, R_j and Q_j are calculated for each bank j=1,2,…,13. (Q_j values are computed by selecting v=0.5). Table 2 gives the scores of banks and their corresponding rankings.

The best alternative, ranked by Q, is the one with the minimum value of Q. It can be seen that Garanti Bank is the best alternative.

Garanti Bank satisfies condition C1 and C2. Because $Q(a'') - Q(a') = 0.128 - 0.039 = 0.089 \geq DQ = 0.083$ and this bank is also the best ranked by R. Therefore Garanti Bank has an acceptable advantage and acceptable stability in decision making with respect to the other banks.

4. CONCLUSION

There are several methods for ranking and comparing banks. Evaluating the financial performance of banks is a complicated process. Analyzing banks performances and monitoring their financial condition is important to depositors, owners, potential investors, managers and regulators (Yue, 1992). In this study banks are rated according to the financial ratios based on their results in 2008. The bank rating list was produced using, the multi-criteria analysis method, called the VIKOR. With this method, banks overall performance are evaluated and it provides rating of banks with respect to other.

After the evaluation Garanti Bank has the highest rate among thirteen banks which are traded in ISE. The main list of banks can be seen in the table especially with respect to Q.

The VIKOR method is sensitive to criteria's weights (w_i). So the researches using VIKOR may test the result with alternative weights. Also the weight v has an important role in identifying the ranking. Further researches may compare results with setting this value between 0 and 1. The VIKOR method can also be used another sectors as a ranking methods and VIKOR method may compare with other MCDM Methods.

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