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Financial Performance of Pension Companies Operating in Turkey with Topsis Analysis Method

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Abstract *In this study, financial performances of the companies were analyzed by TOPSIS method via using financial tables of the sixteen pension and life-pension companies. Firstly, financial ratios which are one of the important indicators for the financial power of companies were determined and calculated for each company separately. Calculated ratios converted to demonstrate of company performance unique point by using TOPSIS method. Companies have sorted according to their calculated performance scores. Financial performance assessment was performed for five terms included in 2008-2012 period and obtained results were compared. Consequently found that, performance scores of the pension companies generally weren't changed during analyze period.*

Key words Financial performance analysis, TOPSIS method, Pension companies, Decision making, Ration analysis

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1. Introduction

Pension companies which are important part of the financial system are greatly contributing to economic growth via intrinsic growth rates at the same time they accomplish a series of financial system function. With the ensuring period, they can effect on economic growth by source saving and source allocation with also managing the various financial risks, (Curak, Loncar and Poposki, 2009). Insurance sector takes on tasks such as providing capital accumulation and uninterrupted activities by giving warrant to the factors which are playing roles in the economy and also this sector is playing an important role within the economic development process.

Accounting data are used considerably when assessing the financial performances, (Soba and Eren, 2011). Financial performance analysis is duration about determining financial development and position of the company by making relation between balance sheet and income statement items. In this period, financial analysis techniques are being benefited by using financial ratios in the purpose of determining strong and weak sides in point of financial side and making short and long term predictions.

Financial rates have wide user mass, (Osteryoun, 1992). Hence, using financial indicators in the performance assessments is providing more accurate results about the objectivity of measurements and results of indicators, (Yükçü and Atağan, 2010).

By 31th December 2012, 3.496.377 agreements are effective in the Private Pension System. Subscribers of these agreements as for growth by 18% and exceeded the 3.1 million. This case demonstrates that, how much trust and interest just have rose to the Private Pension System. In the same period, fund size have rose by 42% subsequently exceeded the 20 billion TL (net asset value 20.346.290.278 TL). By the end of 2012, remaining 15.741.037.013 TL directed to the investment after 436.720.742 TL, part of total contribution of 16.177.757.755 TL, discarded as deduction by Companies.

By the end of 2012, licensed sale authorized intermediaries occurred as; Bank 10.467 (56.2%), private direct sales 4.519 (24.2%), Agency 3.069 (16.5%), corporate sales 202 (1.1%) other 383 (2.1%). "Other" distribution channel includes "Call Center" and "Broker" channels.

Moreover, participation rate to the Private Pension System reach to 42 percentages in 25-34 age interval while this ratio reaches to 6 percentages for the persons under 25 ages. Following 10 years after the establishment of Private Pension System, System reached to 25 billion TL net pension fund value and 3.9 million participants.

In this study, performances of the pension companies which have activities within the financial service sector in Turkey were determined by TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution). Study consists of four chapters. Literature review was included in first chapter. In second chapter, information was given about methodology and data set and in third chapter, analyze was performed and evaluated.

2. Literature review

Decision-maker persons in business firms are always encountering different problems with many criteria while they are performing important functions of the firm such as; profit, cost, production, labor force. Decisions with multiple criteria methods have wide usage area because of making decision in shortest duration about these problems. Especially when potential investors also evaluating most proper companies in their investment, they are using multiple criteria decision making methods like all benefit groups which are interested with business firm.

TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) is one of the multiple-criteria decision making methods that can be used in every sector and it can be helpful method for the decision making duration. It was performed in 1981 by Hwang and Yoon firstly. TOPSIS method tries to determine Positive Ideal Solution (PIS) and Negative Ideal Solution (NIS) points. When PIS is used as definition of highest benefit and lowest cost, NIS is used as definition of lowest benefit and highest cost. Preferred alternative is not only closest to solution, in the same time, it is alternative that is most distant to negative ideal solution; basis underlies TOPSIS approach, (Behzadian, 2012).

TOPSIS method which has usage for the different sectors property is often used for finance literature because it provides ease to persons at the decision point. Limited amount subjective input requirement and provide relative performance measurement of each alternative from a comprehensible mathematical equation features are basic superiorities of this method (Yeh, 2002).

Method specifically was begun to use for measuring and assessment the company's financial performance after 1970's. Barnes (1987) in a study interpreted financial performance of the companies by using financial ratios and the method produced useful information about for the company partners and potential partners were mentioned in Barnes study.

Feng and Wang (2000), investigated the financial performances of five airway services via using 22 financial ratios by TOPSIS method. Subsequently they found this method is useful to designate performance and provide accurate decision making for the business firms.

Behzad Ashtiani *et al*. (2009) have used this method to choose a director from candidates' directors which is one of the most complex periods. And they evaluated 4 candidates for Research & Development department director in a telecommunication company according to five criteria as their; self-confidence, experience, management sufficiency, sufficiency about determination of research area and personality.

Jafarnejad and Salimi (2013) used TOPSIS method in their study on supplier evaluation and decision importance of a manufacturer business firm in global market. For decision of an automobile firm on supplier, 3 suppliers have been evaluated by using 3 criteria as; quality, distribution and reliability from Dixon's 23 criteria.

Manabendra and Choudhury (2009) evaluated 4 criteria as client centeredness, competence, financial possibility and easiness for determining service quality of banking sector.

Deng, Yeh and Willis (2000) have calculated performance score according to each company's financial ratios in their study and evaluate seven textile companies by four financial ratios as profitableness, efficiency, market position and debt. Reciprocate of debt ratio scores were performed and they were accepted as utile criteria.

Yurdakul and İç (2003) studied financial performance of five automotive firms which have activity in the Istanbul Stock Exchange between 1998-2001 via using 7 financial ratios by TOPSIS and gained consistent results when they compare the performance scores for each year and year-end share price.

Eleren and Karagül (2008), used data belong to 21 years period between 1986-2006 in the purpose of determining which year Turkey is successful in the economic manner. They performed TOPSIS method with 7 separate macro variables one of the Maastricht Criteria also and one of the economical success indicators as growth rate, current account deficit/GNP, total public debt/GNP, budget balance/GNP, consumer price index, public debt interest rate and unemployment rate and they indicated that economic crisis have rose in 1996, 2000, 2001 and 2006 years are most unsuccessful years in Turkey in the manner of economy.

Demireli (2010) investigated performance of public banks activating by comparison in Turkey dated 2001-2007. Within this scope, he calculated the performance scores by using TOPSIS method with helping of 10 most used ratios in literature. As a result, all across the country public capitalized banks commonly in business have been effected by local and global financial crisis and their performance scores were constantly fluctuating according to foreign data and no remarkable recovery reported in banking sector were determined.

Soba and Eren (2011) determined total 14 criteria under the 3 main article named as production, marketing and activity and made a success arrangement in his study which he used 4 years data of bus business activating in transportation sector.

Bulbul and Kose (2009) performed eight financial ratios by TOPSIS and ELECTRE methods in their study by using data between 2005-2008 years of 19 food sector companies traded in Istanbul Stock Exchange. In both methods, similar results were gained.

3. Methodology and Data

Basic concept of method is m alternatively multiple criteria decision make method as m pointed (alternative) geometric system in n sized (parameter) area. TOPSIS method consists of steps mentioned below.

3.1. TOPSIS method

Developed by Hwang and Yoon (1981) method's basic is depending on closest distance to positive-ideal solution and most distance to negative-ideal solution (Ahyjith, Ilangkumaran and Kumanan, 2008).

1st Step: Forming Decision Matrix (A): Alternatives are positioned as decision points on lines and evaluation criteria about decision positioned on columns in the decision matrix. In the $A_{ü}$ decision matrix, m shows decision point number and n shows evaluation factor number (Rao 2008).

$$A_{ij} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ . & . & . & . \\ . & . & . & . \\ . & . & . & . \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}$$

2nd Step: Forming normalized decision matrix (R): In this step which involves normalizing by square root of the sum of the squares scores or features belong to decision matrix criteria, calculated and benefited from A matrix by equation mentioned below (Opricovic and Tzeng, 2004).

$$r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{k=1}^{m} a_{kj}^2}} \qquad (1)$$

Where:

($r_{ij;}$ i: 1,2,….N; criteria number j: 1,2,….K; alternative number R matrix;

$$R = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2k} \\ . & . & . & . \\ . & . & . & . \\ . & . & . & . \\ r_{n1} & r_{n2} & \dots & r_{nk} \end{bmatrix}$$

3rd Step: Forming Weighted Normalized Decision Matrix (V): In this step firstly weighted values (w_i) about evaluation factors are determined ($\sum_{i=1}^{n} w_i = 1$).Wj: as for each j. criteria, relative weight values of elements of normalized decision matrix according to purpose are found, (Monjezi *et al*., 2010). And then, V matrix is formed by multiplying elements in the R matrix each column with Wi value.

V matrix;

$$V_{ij} = \begin{bmatrix} w_1 r_{11} & w_2 r_{12} & \dots & w_n r_{1n} \\ w_1 r_{21} & w_2 r_{22} & \dots & w_n r_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ w_1 r_{m1} & w_2 r_{m2} & \dots & w_n r_{mn} \end{bmatrix}$$

4th Step: Forming Positive Ideal (A^*) and Negative Ideal (A^-) Solutions:

To form the ideal solution set, weighted factors in the V matrix in other words biggest ones of the column values are (smallest value is selected if related evaluating factor have direction of minimization,) selected. Ideal solution set forming showed in the equation mentioned below.

$$A^* = \left\{ (\max_i v_{ij} \,|\, j \in J), (\min_i v_{ij} \,|\, j \in J' \right\} \quad (2)$$

Set which will be calculated from formula is showed as $A^* = \{v_1^*, v_2^*, ..., v_n^*\}$ too.

And negative ideal solution set formed by selecting weighted evaluation factors in other words smallest ones of the column values (if related evaluating factor have direction of maximization it is the biggest one). Negative ideal solution set forming showed in the equation below.

$$A^- = \left\{ (\min_i v_{ij} \,|\, j \in J), (\max_i v_{ij} \,|\, j \in J' \right\} \quad (3)$$

Furthermore set which will be calculated from formula can be showed as $A^- = \{v_1^-, v_2^-, ..., v_n^-\}$

In both formulas, *J* demonstrates the benefit (maximization) and *J'* demonstrates the cost (minimization) value (Dumanoğlu and Ergül, 2010).

5th Step: Calculation of Distance between Alternatives

Distance between alternatives is found by n sized Euclidean Distance Approach. Distance from Positive-ideal solution and distance from negative-ideal solution (S_i^-) of each alternative are calculated by formulas mentioned below.

$$S_i^* = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^*)^2} \quad (4)$$

$$S_i^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2} \quad (5)$$

Calculated here S_i^* and S_i^- number will be amounted as number of decision point, (Özer *et al*. 2010).

6th Step: Calculation of Relative Closeness to the Ideal Solution

In calculation of closeness (C_i^*) of the all decision points to the ideal solution, ideal and negative ideal distinction measurements are used. Calculation of relative closeness to the ideal solution has shown in the formula below, (Olson 2004).

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^*} \qquad 0 \le C_i^* \le 1 \quad (6)$$

7th step: Closeness of the alternatives to the ideal solution:

Closeness of the alternatives to the ideal solution is sorted according to C_i^* value. Here, C_i^* value shows success of the *i* alternative in sector and high values indicate higher success.

3.2. Data Set

Finance tables of the Companies which traded in 2008-2012 in Istanbul Stock Exchange, were analyzed to investigate the financial performance of the pension companies.

3.2.1. Companies under the Scope of Work

Companies under the scope of work were shown in Table 1.

BNP Paribas Cardif Pension Company has involved sector by buying Fortis Pension and Life Company in 2011. Mentioned company's data about 2008-2009-2010 are belonging to Fortis Pension and Life Company. And Başak Pension Life gained article as Groupama Pension when it was bought by Groupama dated by 30th September 2009. Deniz Pension and Life began its activity named as Metlife Pension and Life when it was bought by Metlife Group.

Table 1. Pension Companies

Companies	Companies
Aegon Emeklilik ve Hayat	Groupama Emeklilik
Allianz Hayat ve Emeklilik	Vakıf Emeklilik
Anadolu Hayat Emeklilik	Yapı Kredi Emeklilik
Avivasa Emeklilik ve Hayat	Metlife Emeklilik ve Hayat
BNP Paribas Cardif Emeklilik	Axa Hayat ve Emeklilik
Ergo Emeklilik ve Hayat	Ziraat Hayat ve Emeklilik
Finans Emeklilik ve Hayat	Halk Hayat ve Emeklilik
Garanti Emeklilik ve Hayat	Asya

3.2.2. Financial Tables are used for Study

Financial tables of 16 companies in 2008-2012 were analyzed by TOPSIS method depending on multiple decisions making and 8 financial ratios. Financial ratios which affect financial performance of the companies, under the scope of work, showed in Table 2.

Table 2. Financial Ratios of Pension Companies

F	Financial ratios
F1	Liquid Assets Ratio
F2	Equity Profit Ratio
F3	Profitability of Pension Business Technical Income
F4	Profitability of Life Insurance Premium Revenues
F5	Combined Ratio (Expense Ratio + Net Loss Ratio)
F6	Returns of Investments
F7	Asset Profitability
F8	Claims paid, ceded/Net written premiums

Ratios which are used for financial analysis of pension companies, were explained below

F1 Liquid Assets Ratio (Cash+ Banks+ Securities portfolio/Total Assets): Ratio shows portion of the liquid assets within the total assets. With this ratio, how much company assets are liquid, can be understood. High ratio indicates the company can provide its cash needs much easier.

F2 Equity Profit Ratio (Net Term Profit/Equities): Shows how much effective the company can use its equities.

F3 Profitability of Pension Business Technical Income: Pension Technical Profit/ Pension Technical Income: Shows how much degree of technical profit has been earned from incomes in Private Pension branch. This ratio is expected to be higher than the sector average.

F4 Profitability of Life Insurance Premium Revenues: Shows how much degree of technical profit has been earned from incomes in Life Insurance branch. This ratio is expected to be higher than the sector average.

F5 Combined Ratio (Expense Ratio + Net Loss Ratio): Ratio measures the situation of operating expenses and occurred loss against earned premium. Ratio is expected to be low. Ratios under "1" indicate the profit in life pension branch and activity expenditures and claims are managed effectively.

F6 Returns of Investments: Net Investment Incomes (Investment Income + Life Branch Investment Incomes - Investment Expenses)/Current Investment (Financial Assets + Tangible Assets + Intangible Assets): It shows companies how much earn income from the current investments.

F7 Asset Profitability (Net Period Profit/Total Assets): It shows companies how much effectively using their current assets.

F8 Claims paid, ceded/Net written premiums: It shows company how much can provide the net premium production in current period for the net claims paid. Ratio is expected to be low and its absolute value is under 1. If the absolute value of ratio is above "1", it means negative situation for the company.

3.2.3. Study Limitations

In study period, some company's data couldn't be reachable for each year. Company's number in business in 2008 is 13. However, 11 companies were taken basis for 2008 year analysis because AXA, Metlife and ING data were not reachable and insufficiency was emerged under scope of ratio calculation. In 2009 and after 2009, Metlife Company was involved because its data is fully reachable. In 2011, analysis was performed with 15 companies including AXA, Ziraat and Halk Pension companies. With the involving of Asya Pension and Life Company in 2012, total 16 companies positioned within the assessment.

Because of the each service of pension companies is depending on a probability calculus and this probability calculations are generally consisting average possibility according to law of large numbers, determining the period profit or loss is not possible. In case of the risk exceeds the average possibility limit, loss occurs and if it is under limit profit occurs. Furthermore, technical provisions, that expressing the precautions of the companies, are allocated from the premiums which are paid by insured person, not from the profit like the other companies providing. Another important point is financial tables can have definite error margin because technical provisions can consist some assumptions.

4. Analysis and Findings

Study by using financial ratios that shows Pension companies performance consists of 7 steps. Calculations in each step and grading of companies according to their general performance scores in 2008-2012 periods were given by tables.

Step 1: Forming of Decision Matrix (A)

A matrix which is beginning matrix contains decision points that need to be priorities graded on its lines and evaluation factors that will be used for decision on columns. Study has 12 decision points (companies) for 2008 and 8 evaluation factors (financial ratios). In first step for the TOPSIS method (12x8) sized Standard Decision Matrix was formed. 2008 year decision matrix that belongs to companies arranged in Table 3. To serve as an example, only data about 2008 year were shown in table.

Table 3. 2008 year Multiple Purpose Decision Matrix of Pension Companies

Companies	Likt	Özsk	Etgk	Hpgk	BO	Yg	Ak	Ötyp
E1	0.37	-0.49	-1.33	-0.4	-2.66	0.23	-0.08	-2.29
E2	0.64	0.13	-0.86	0.12	-1.54	0.19	0.00	-2.09
E3	0.59	0.15	0.12	0.03	-1.28	0.17	0.01	-1.81
E4	0.25	0.15	0.50	-0.48	-1.94	0.28	-0.01	-2.60
E5	0.20	-0.25	-0.80	-0.01	-0.93	0.32	-0.03	-1.38
E6	0.78	-0.21	-7.75	0.09	-1.11	0.41	-0.08	-2.47
E7	0.68	0.13	-32.27	0.02	-0.55	0.57	0.01	-0.48
E8	0.21	0.41	0.26	0.36	-0.59	0.71	0.04	-0.67
E9	0.51	0.39	-0.94	0.06	-0.82	0.40	0.01	-0.99
E10	0.45	0.15	-0.32	0.04	-1.98	0.24	0.01	-2.18
E11	0.39	0.17	-0.12	0.07	-1.41	0.24	0.01	-2.12
E12	0.90	0.24	0.25	0.22	-0.24	0.24	0.15	-0.20

Step 2: Forming Normalized Decision Matrix (R)

Normalized Decision Matrix was calculated by using A matrix elements and Equation (1).

Table 4. Normalized Decision Matrix

Companies	Likt	Özsk	Etgk	Hpgk	BO	Yg	Ak	Ötyp
E1	0.196745	-0.53002	-0.03999	-0.51537	-0.54033	0.180227	-0.40825	-0.36859
E2	0.340315	0.140617	-0.02586	0.15461	-0.31282	0.148883	0.00000	-0.3364
E3	0.313728	0.16225	0.003608	0.038653	-0.26001	0.133211	0.051031	-0.29133
E4	0.132935	0.16225	0.015035	-0.61844	-0.39407	0.219407	-0.05103	-0.41849
E5	0.106348	-0.27042	-0.02406	-0.01288	-0.18891	0.250751	-0.15309	-0.22212
E6	0.414759	-0.22715	-0.23304	0.115958	-0.22548	0.321275	-0.40825	-0.39756
E7	0.361584	0.140617	-0.97035	0.025768	-0.11172	0.44665	0.051031	-0.07726
E8	0.111666	0.443483	0.007818	0.463831	-0.11985	0.556354	0.204124	-0.10784
E9	0.271188	0.42185	-0.02827	0.077305	-0.16657	0.313439	0.051031	-0.15935
E10	0.239284	0.16225	-0.00962	0.051537	-0.4022	0.188063	0.051031	-0.35088
E11	0.207379	0.183883	-0.00361	0.090189	-0.28641	0.188063	0.051031	-0.34123
E12	0.478568	0.2596	0.007517	0.283452	-0.04875	0.188063	0.765466	-0.03219

Step 3: Forming of Weighted Normalized Decision Matrix (V)

When Weighted Normalized Decision Matrix (V) is formed, column values of the evaluating factors within the normalized decision matrix (R) were summed and these column values also were summed subsequently total criteria value (0.331435) was gained. Weights were calculated by dividing each column

value of evaluating factors to total value of evaluating factors. According to this, weights belong to evaluating factors:

W1= 9.578056 **W2**= 3.16568 **W3**= -3.92482 **W4**= 0.466488 **W5**= -9.08761 **W6**= 9.457034 **W7**= 0.615881 **W8**= -9.27071

Finally from each evaluation factor gained weight is (W values) multiplied with evaluate factors of each companies in the normalized decision matrix and V table is gained. For instance, evaluating V value belong to LİKT of Aegon company is calculated by (0.196745*9.578056)= 1.88443

Table 5. Weighted Normalized Decision Matrix (V)

Companies	Likt	Özsk	Etgk	Hpgk	BO	Yg	Ak	Ötyp
E1	1.88443	-1.67786	0.156964	-0.24041	4.91029	1.704416	-0.25143	3.417088
E2	3.259555	0.445147	0.101496	0.072124	2.8428	1.407996	0.00000	3.118652
E3	3.004902	0.513631	-0.01416	0.018031	2.362846	1.259786	0.031429	2.700842
E4	1.273263	0.513631	-0.05901	-0.2885	3.581189	2.074941	-0.03143	3.879663
E5	1.018611	-0.85605	0.094415	-0.00601	1.716756	2.371361	-0.09429	2.059206
E6	3.972582	-0.71908	0.914643	0.054093	2.049031	3.038307	-0.25143	3.68568
E7	3.463277	0.445147	3.808454	0.012021	1.015286	4.223987	0.031429	0.716245
E8	1.069541	1.403925	-0.03068	0.216372	1.089125	5.261458	0.125716	0.999759
E9	2.597458	1.335441	0.110937	0.036062	1.513699	2.964201	0.031429	1.477256
E10	2.291874	0.513631	0.037766	0.024041	3.655028	1.778521	0.031429	3.252948
E11	1.986291	0.582115	0.014162	0.042072	2.602823	1.778521	0.031429	3.163417
E12	4.583749	0.82181	-0.0295	0.132227	0.443034	1.778521	0.471435	0.298436

Step 4: Ideal (A+) and Negative Ideal (A-) Solution Determining

In 4th step, ideal A^+ and ideal A^- solution sets were formed with the assist of equation (2) and (3). A^+ set calculated according to largest value of each column of V matrix, A^- set calculated according to smallest value of each column of V matrix.

A+ =	4.583749	1.403925	0.059009	0.216372	-0.44303	5.261458	0.471435	-0.29844
A-- =	1.018611	-1.67786	-3.80845	-0.2885	-4.91029	1.259786	-0.25143	-3.87966

Step 5: Calculating of Separation Measures

Distance between alternatives is found by n Sized Euclidean Distance approach. Positive ideal solution of distance of alternatives S^+ and negative ideal solution distance S^- were calculated via equation 4 and 5.

S^+ **=** { 7.739282; 5.612774; 5.384325; 6.71467; 5.593396; 5.037123; 4.352669; 3.657768; 3.466752; 6.120635; 5.714469; 3.532373}

S^- **=** { 14.61318; 25.55854; 29.45439; 22.49396; 29.32228; 23.75231; 41.08692; 63.59299; 44.72925; 22.70923; 26.76761; 58.29363}

Step 6: Calculation of Relative Closeness to Ideal Solution (C)

Each of decision point closeness to ideal solution according to equation 6;

Table 6. 2008 Year Closeness Values to Positive Ideal Solution C^+

C1	0.653762
C2	0.819938
C3	0.84545

C4	0.770113
C5	0.839803
C6	0.825036
C7	0.90421
C8	0.94561
C9	0.92807
C10	0.787698
C11	0.824073
C12	0.942866

C_i^* Value is ranged between 0≤ C_i^* ≤ 1, (Jafarnejad and Salimi 2013). When Ai=A+, it is equal to C_i^* and when related decision point to ideal solution is Ai=A+, C_i^* = 0. This is showing that absolute closeness of related decision point to negative ideal solution.

Step 7: Grading of Companies According to Their Points and Performances

Alternatives are determined decision grade by descending order according to Ci. Alternative which have highest Ci are chosen, (Zolfani *et al*., 2012).

5. Results and conclusions

Aim of study is investigating performance of pension companies comparatively according to years via TOPSIS method which is one of from the multiple decision making methods. In this regard, performance evaluation was completed by using five years datum in 2008-2012. When datum about companies was prepared, eight financial ratio that mostly used and indicating performances of companies, were calculated separately for each company. Gained datum was used as input of TOPSIS method and performance points were determined. Consistent results were obtained in years that involving analysis period at ranking about performance points of companies.

As a result of study on companies in business about pension sector in period 2008-2012, Table 7 was prepared. E8 Pension Company was first rank by having highest performance point in 2008. E12 company second rank, E9 company third rank and E1 Company ranked as last. E12 Company that ranked second in first year, ranked as first in 2009 and 2010. However in 2011 and 2012, despite of decreased level to fourth rank because of three new and powerful companies joining the sector, it is holding first rank when we assessed it between current companies. If companies gained points examined one by one, dramatic increase and decrease are not expressed but consistent tendency is indicated. Except for one company from first four ranked companies, other three companies protected their position in analysis period. The result that lowest performance showing companies positioned in last ranks in years can be gained.

TOPSIS method is used to determine financial performance grading of companies in different sectors such as automotive, transporting, food, technology. In addition to that contributing to the literature, were tried by demonstrating of method can be used for important sectors such as life insurance and pension sector in this study too.

Consequently results gained in this study are giving information about performance situations of companies in sector to firstly business firm directors and are also expected that will help current or potential investors about decisions they will make.

Table 7. Grading of Companies According to Their Points and Performances

Comp.	2008		2009		2010		2011		2012	
	Score	**Sequence Number**	**Score**	**Sequence Number**	**Score**	**Sequence Number**	**Score**	**Sequence Number**	**Score**	**Sequence Number**
E1	0.654	12	0.746	12	0.845	11	0.363825	13	0.536635	9
E2	0.820	9	0.851	8	0.867	10	0.36016	14	0.46023	13
E3	0.845	5	0.914	5	0.925	7	0.428344	10	0.486914	12
E4	0.770	11	0.904	6	0.930	5	0.39159	12	0.503145	11
E5	0.840	6	0.900	7	0.890	9	0.551198	7	0.322847	15

Comp.	2008		2009		2010		2011		2012	
	Score	Sequence Number	Score	Sequence Number	Score	Sequence Number	Score	Sequence Number	Score	Sequence Number
E6	0.825	7	0.786	10	0.926	6	0.399353	11	0.291032	16
E7	0.904	4	0.941	3*	0.951	3*	0.598954	6	0.867511	1*
E8	0.946	1*	0.950	2*	0.963	2*	0.661813	5	0.770344	2*
E9	0.928	3*	0.934	4*	0.730	12	0.294591	15	0.52109	10
E10	0.788	10	0.831	9	0.936	4*	0.498543	9	0.597357	5
E11	0.824	8	0.762	11	0.914	8	0.513372	8	0.547235	8
E12	0.9429	2*	0.970	1*	0.979	1*	0.672938	4*	0.564046	6
E13							0.729796	2*	0.552133	7
E14							0.850966	1*	0.724593	3*
E15							0.689896	3*	0.688541	4*
E16									0.366703	14

References

1. Ashtiani, B., Haghighirad, F., Makui, M., Montazer, G.A., (2009). Extension of f Fuzzy TOPSIS Method Based on Interval-Valued Fuzzy Sets. Applied Soft Computing 9, www.elsevier.com/locate/asoc [Accessed 13 June 2011].

2. Barnes, A., (1987). The analysis And Use of Financial Ratios: A Review Article. *Journal of*

3. Business and Finance Accounting, Vol.14, 449–461.

4. Behzadian, M., Khanmohammadi, O S., Yazdani, M., and Ignatius, J., (2102). A state-of the-Art Survey of TOPSIS Applications. Expert Systems With Applications, 39(17), 13051-13069.

5. Bulbul, S., Kose, A., (2009). Türk Gıda Şirketlerinin Finansal Performansının Çok AmaÇlı Karar Verme Yöntemleriyle Değerlendirilmesi. Atatürk Universitesi IIBF Dergisi, 10. Ekonometri ve Istatistik Sempozyumu Özel Sayısı, (with English Abstract**),** 71-97.

6. Curak, M., Loncar, S., Poposki, K., (2009). Insurance Sector Development and Economic Growth in Transition Countries, International Research Journal of Finance and Economics, Vol. 34, 29-41.

7. Eleren, A., Karagül, M., (2008). 1986-2006 Türkiye Ekonomisinin Performans Değerlendirmesi. Yönetim ve Ekonomi Dergisi, Celal Bayar Üniversitesi İİBF Yayını, Manisa/Turkey (with English Abstract) 15 (1), 1-14.

8. Deng, H., Yeh, C.H., Willis, R. J., (2000). Inter-Company Comparison Using Modified TOPSIS With Objective Weights. Computers & Operations Research, 27(10), 963-973.

9. Dumanoğlu, S., Ergül, N., (2010). İMKB' de İşlem Gören Teknoloji Şirketlerinin Mali Performans Ölçümü. Muhasebe ve Finans Dergisi, (with English Abstract), 48(10), **ISSN:**1304-0391, 101-111.

10. Demireli, E., (2010). Topsis Çok Kriterli Karar Verme Sistemi:Türkiye'deki Kamu Bankaları Üzerine Bir Uygulama. Girişimcilik ve Kalkınma Dergisi, (with English Abstract), 5 (1), 101-112**.**

11. Feng, C.M., Wang, R.T., (2000). Performance Evaluation for Airlines Including the Consideration of Financial Ratios. Journal of Air Transport Management, Vol.6, 133-142.

12. Jafarnejad, A., Salimi, M., (2013). Grey Topsis Method for Supplier Selection with Litrature and Delphi Critaria in an Auto Company. Academia Arena 5(12) http://www.sciencepub.net/academia [Accessed 14 June 2012].

13. Manabendra, N. P., Choudhury, K., (2009). Exploring The Dimensionality Of Service Quality: An Application Of TOPSIS In The Indian Banking Industry. Asia-Pacific Journal of Operational Research 26 (1), 115-133.

14. Soba, M., Eren, K., (2011). Topsıs Yöntemini Kullanarak Finansal ve Finansal Olmayan Oranlara Göre Performans Değerlendirilmesi, Şehirlerarası Otobüs Sektöründe Bir Uygulama. Sosyal ve Ekonomik Araştırmalar Dergisi, Selçuk Üniversitesi, (with English Abstract), 15 (21), 23-40.

15. Monjezi, M., Dehghani, H., Singh, T.N., Sayadi, A.R., Gholinejad, A., (2010). Application of TOPSIS Method for Selecting the Most Appropriate Blast Design. Arabian Journal of Geosciences, Springer publication, 5, DOI: 10.1007, 95-101.

16. Rao, R.V., (2008). Evaluation of Environmentally Conscious Manufacturing Programs Using Multiple Attribute Decision-Making Methods", Proceedings of the Institution of Mechanical Engineers - Part B - Engineering Manufacture, 222 (3), 441-451.

17. Olson., D.L., (2004). Comparison of Weights in Topsis Models. Pergamon Mathematical and Computer Modelling, 40 (10) 721–727.

18. Opricovic, S., Tzeng, G.H., (2004). Compromise Solution by MCDM Methods: A Comparative Analysis of VIKOR and TOPSIS. European Journal of Operational Research, 156 (2), 445–455.

19. Osteryoung, J., Constand, R., Nast,D., (1992). Financial Ratios in Large Public and Small Private Firms. Journal of Small Business Management, 30(3), 35-46.

20. Özer, A., Öztürk, M., Kaya, A., (2010). İşletmelerde Etkinlik ve Performans Ölçmede VZA, Kümeleme ve TOPSIS Analizlerinin Kullanımı: İMKB İşletmeleri Üzerine Bir Uygulama. Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, (with English Abstract) 14 (1), 233-260).

21. Shyjith, K., İlangkumaran, M., Kumanan, S., (2008). Multi-Criteria Decision-Making Approach to Evaluate Optimum Maintenance Strategy in Textile Industry. Journal of Quality in Maintenance Engineering, 14(4), 375-386.

22. Soba, M., Eren, K., (2011). TOPSIS Yöntemi Kullanılarak Finansal ve Finansal Olmayan Oranlara Göre Performans Değerlendirmesi, Şehirlerarası Otobüs Sektöründe Bir Uygulama. Sosyal ve Ekonomik Araştırmalar Dergisi, (with English Abstract), 15(21), 23-40.

23. Yeh, C.H., (2002). AProblem Based Selection Of Multi-Attribute Decision-Making Methods. Journal of International Transactions in Operational Research, Vol.9, 169-181.

24. Yurdakul, M., İç, Y. T., (2003). Türk Otomotiv Firmalarının Performans Ölçümü ve Analizine Yönelik TOPSIS Yöntemini Kullanan Bir Örnek Çalışma. Gazi Üniversitesi Mühendislik ve Mimarlık Fakültesi Dergisi, (with English Abstract) 18 (1), 1-18.

25. Yükçü, S., Atağan, G., (2010). TOPSIS Yöntemine Göre Performans Değerleme. Muhasebe ve Finansman Dergisi, (with English Abstract), Vol. 45, 28-35.

26. Zolfani, S. H., Antucheviciene, J., (2012). Team Member Selecting Based on AHP and TOPSIS Grey. Engineering Economics, 23(4), 425-434.