ANALYZING SECURITIES INVESTMENT TRUSTS TRADED IN BIST VIA AHP-PROMETHEE METHODOLOGY

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Abstract

It is important to make investment in capital markets for smaller investors by reducing their risks. For this purpose, collective investment undertakings consisted of mutual funds and investment trusts are established. Investment trusts as collective investment undertakings are the institutions of capital markets established as corporation. They are pursuant to registered capital basis with the purpose of managing portfolios composed of gold and other precious metals traded in national and international stock exchanges and over the counter markets via capital market instruments. Apart from other trusts securities investment trusts' activity area is classified as managing portfolios composed of gold and other precious metals by only capital market instruments. In this study it is aimed to evaluate the performance of nine securities investment trusts traded in BIST via AHP-PROMETHEE methodology. Data sets for this study are financial ratios consist of nine securities investment trusts traded in BIST. While weights of financial ratios are found by using AHP, rankings of securities investment trusts are obtained via PROMETHEE. Furthermore, each year's sensitivity analysis in terms of criteria and GAIA plane which can be used for visual representation of ranking results is constructed.

Key words: *financial performance analysis, Securities investment trusts, AHP, PROMETHEE*

1. INTRODUCTION

Account of the savers valorize their savings via security taking from issuers, intermediaries and securities exchanges. But the issue of security investment requires knowledge and experience. Furthermore, portfolios composed of insufficient sized individual savings are risky in terms of capital or return of portfolio. Thus, mutual funds and investment trusts namely collective investment undertakings are established. Collective investment undertakings are named as investment trusts in case of established as separate and independent legal entities. On the other hand, they are named as mutual funds pursuant to agreement formed by other legal entities. Apart from similar purposes and economic functions, investment trusts and mutual funds differentiate each other in terms of working styles and provided services to investors (Capital Markets Board of Turkey n.d.)

According to the definition by Capital Markets Board, investment trusts as collective investment undertakings are the institutions of capital markets established as corporation. And they are pursuant to registered capital basis with the purpose of managing portfolios composed of gold and other precious metals traded in national and international stock exchanges and over the counter markets via capital market instruments (Çıtak, 2008). Apart from other trusts, securities investment trusts' activity area is classified as managing portfolios composed of gold and other precious metals by only capital market instruments (Capital Markets Board of Turkey n.d.)

Portfolio management consists of asset selection with aim of diversification based risk spreading and portfolio value increase for shareholders with effective determination of assets purchase and sale timing. Portfolios are managed by investment trusts on the behalf of investors and in addition to that trusts should bear the costs such as portfolio management and investment consulting and also operating expenses in the areas of marketing, sales and distribution. It is important to define the extent to which investment trusts create value for shareholders over against expenses. Operating effectiveness

provided by investment trusts enable sustainable operations and value increase from the viewpoint of shareholders (Çıtak, 2008).

Performance can be defined as efficiency in production or effectiveness in service. It is important to determine performance for firms' future condition. For that reason, firms' performance should be measured (Yüreğir & Nakıboğlu, 2007).

On the other hand, financial performance can be defined as analysis of firms' financial performances and financial strategies' results. Business executives view past decisions' results and make future investment decisions via financial performance measurement (Uyguntürk & Korkmaz, 2012). Financial performance results concern entire stakeholders.

Financial analysis which can be made by business executives, investors or credit firms is based on establishing relationships between items appeared in financial tables such as balance sheet and income statement and commenting on this matter.

Financial ratios show relationships between financial table items mathematically (İç et al., 2015). Firms' strengths and weaknesses in terms of liquidity, growth and profitability can be revealed by financial ratios. Firms' year based changes are detected with the aim of financial ratios. Also sector based performance comparisons within same period are possible by using financial ratios. For this purpose, financial ratios for these firms within the same period are calculated (Uyguntürk & Korkmaz, 2012).

Basically financial ratios are classified into four group namely liquidity, financial structure, operating and profitability ratios. Firms' abilities to pay short-term debts are determined via liquidity ratios. Currency ratio and cash ratio are included in first group.

Financial structure ratios are used for determining the firm's outsourcing level. Leverage ratio denoted as total debts/total assets is considered in second group and it is possible to detect the percentage of assets subsidized by debts in case of assets selling (Dumanoğlu, 2010).

Operating ratios are used for exhibiting the efficient usage level of firms' assets. Asset turnover ratio denoted as net sales/total assets is considered in third group. Profitability ratios are used for measuring the earning power of firms' after activities fulfilled. Ratios namely net profit/total assets, net profit/capital and net profit/net sales are included in last group. Financial ratios used in this study are showed in Table 1.

Financial Ratio Groups	Ratios	Explanation
Liquidity Ratios	Currency Ratio	Current Assets/Short Term Debts
	Cash Ratio	(Liquid Assets + Securities)/ Short Term Debts
Financial Structure Ratios	Leverage Ratio	Total Debts/Total Assets
Operating Ratios	Asset Turnover Ratio	Net Sales/ Total Assets
Profitability Ratios	Net Profit/Total Assets	Net Profit/Total Assets
	Net Profit/Capital	Net Profit/Capital
	Net Profit/Net Sales	Net Profit/Net Sales

Table 1: Financial Ratios

Source: Tayyar et al. (2014)

Purpose of this study is to evaluate firms' performance by taking financial ratios and financial experts into the account. For this reason, firstly local and global weights of criteria and sub-criteria related to financial ratios are obtained by using Analytic Hierarchy Process (AHP) one of the mostly used Multi

Criteria Decision Making (MCDM) methods. Super Decisions software is used for obtaining weights of criteria and sub-criteria. Following to these firms' final rankings are determined by means of PROMETHEE method. Visual PROMETHEE software is used for ranking securities investment trusts. Data sets for this study are financial ratios consist of nine securities investment trusts traded in BIST. Financial ratios are chosen according to financial sector applications and finance literature. The rest of the paper is organized as follows: In section two, a literature review about performance analysis is shortly given. In the third section, methodology for this study namely AHP and PROMETHEE is presented. In section four, results of proposed methodology are given. Finally, in the last section concluding remarks and future recommendations are given.

2. LITERATURE REVIEW

Literature consists not only securities investment trusts but also collective investment undertakings. In addition to the securities investment trusts traded in Turkey, collective investment undertakings aforementioned in international literature are considered.

Murthi, Yoon and Preyas (1997) compared the efficiency of 731 mutual funds placed in seven different categories by using data envelopment analysis (DEA) based portfolio efficiency index. According to the research results mutual fund categories namely aggressive growth, asset allocation, income and equity income are more effective than other ones in terms of sourcing.

Edelen and Warner (2000) revealed the relationship between stock yields and investment fund cash flows on daily basis. Goetzman and Massa (2003) proved the existence of significant relationship between S&P 500 index and index funds. Gregoriou, Sedzro and Zhu (2005) analyzed the 168 hedge funds performance appraisal via DEA. Ferreria et al. (2012) found strong relationship between mutual funds and countries economical and financial developments.

Tarım and Karan (2001) measured the performance of investment funds consisting 53 type A and 69 type B ones within the period of January-August 1998 via DEA method and traditional performance criteria such as Sharpe ratio, Treynor ratio, Jensen α and Jensen α/β. While expense ratio, standart deviation and investment funds turnover ratio are considered as inputs of data envelopment model, return on investment fund is handled as output. According to the results type B investment funds over-performed than type A ones regardless of criterion.

Topuz, Darrat and Shelor (2005) analyzed the efficiency of 235 real estate investment trusts (REITs)within the period of 1989-1999 by data envelopment models. Canbaş and Kandır (2006) examined the effect of investor psychology on investment trusts' discount ratio and found negative relationship. Yıldız (2006) measured the efficiency of 53 investment funds traded in Turkey within the period of 2001-2003 by using DEA method under the assumption of constant and variable returns to scale. Çıtak (2008) analyzed the efficiency of REITs traded in Turkey within the period of 2005-2007 via DEA. Eken and Pehlivan (2009) made valuation and ranking 46 type A and 49 type B investment funds listed in Turkish capital markets within the period of 2006-2009 according to performance measurement methods namely Sharpe, Treynor and Alfa indexes. Also DEA is used for analyzing investment funds and their rankings are made with regard to portfolio theory performance criterion.

3. METHODOLOGY

3.1. Analytic Hierarchy Process (AHP)

The analytic hierarchy process (AHP) is a kind multi-criteria decision making technique developed by Thomas L. Saaty in the 1970's. It is stated for analyzing complex decisions, based on mathematics and psychology (Satty, 2008).

AHP has three stages; (Saaty, 1994)

- Defining the hierarchy
- Evaluation by pairwise comparison
- Priorities (weight scores) calculation

Depending on judgments of experts, criteria and sub-criteria are compared pairwise. AHP is a method based on paired comparisons to derive ratio scales. By Saaty's 1-9 scale, these criteria/subcriteria are weighted depending on their relative importance levels. (Saaty, 1977)

Intensity of Importance	**Definition**
1	Equal Importance
3	Weak importance of one over another
5	Strong Importance
7	Demonstrated importance
9	Absolute Importance
2, 4, 6, 8	Intermediate values

Table 2: Saaty's 1-9 Scale for Pairwise Comparisons

Source: Saaty, 1994

After these comparisons A matrix is achieved. After comparison of any two criteria or decison alternatives, if the researcher come up with x value, the opposite comparison value is 1/x. Like, if $a_{23}=2$ then $a_{32}=1/2$.

$$A = \left| a_{ij} \right|_{nxn} \tag{1}$$

By using formula 2 we achieve B matrix for decision criteria.

$$b_{ij} = \frac{a_{ij}}{\sum_{1}^{n} a_{ij}} \tag{2}$$

$$B = \left| b_{ij} \right|_{nxn} \tag{3}$$

From B matrix, we use Formula 4 to calculate weighted scores of decision criteria.

$$W_i = \frac{\sum_{1}^{n} b_{ij}}{n} \tag{4}$$

$$W = \left| w_i \right|_{nx1} \tag{5}$$

After these calculations we get weighted score vectors for decision criteria. This process is repeated according to decision criteria for decision alternatives. When weighted scores of decision alternatives related to each decision criteria, decision alternatives' weighted scores are achieved. With multiplication of weighted scores vector of decision criteria and weighted scores of decision alternatives total scores of decision alternatives are achieved.

$$W = \left|w_i\right|_{nx1} * \left|w_{ij}\right|_{nxm} \tag{6}$$

These scores give rankings of decision criteria.

Consistency ratio is calculated to look whether pairwise comparisons of decision criteria and alternatives are consistent. The lower (higher) the consistency ratio, the higher (lower) the pairwise comparisons' consistency. Consistency ratios up to %10 are acceptable. If the ratio is more than %10 then the decision maker should revise their decisions regarding pairwise comparisons. Consistency ratio is calculated as formula given below (Saaty&Vargas, 2000).

CI: Consistency Index, RI: Random Consistency Index, CR: Consistency Ratio

$$\lambda = AW \tag{7}$$

$$CI = \frac{\lambda_{\max} - n}{n-1} \tag{8}$$

$$CR = \frac{CI}{RI} \tag{9}$$

3.2. Promethee

PROMETHEE developed by Brans is a multi-criteria decision making method used in selection and ranking problems according to decision maker's desire. It is prioritization method evaluating alternatives predetermined preference functions, comparing them pairwise and providing partial (PROMETHEE I) and complete (PROMETHEE II) ranking. Decision maker states the importance of criteria over others on rational scale and criteria weights assigned by decision makers shows the trade-off between criteria. Additionally, differences between the values of criteria are significant and consistent (Keyser & Peeters 1996). PROMETHEE has been applied in a number of fields such as environment management (Beynon & Wells, 2008), hydrology and water management (Haykowicz & Collins, 2007), business and financial management (Hababou & Martel,1998), chemistry (Lim, Ayoko &Morawska, 2005), logistic and transportation (Marinoni, 2005), manufacturing and assembly (Anand & Kodali, 2008), energy management (Madlener & Stagl, 2005), social (Raveh, 2000), design (Coelho & Bouillard, 2005), agriculture (Kokot & Phuong, 1999), education (Colson, 2000), sports (Olson, 2001) and government (Albadvi, 2004).

In order to apply PROMETHEE method two types additional information are required namely: a) Information showing relative importance (or weights) of criteria that is considered b) Information about decision maker's preference function that is used for comparing contribution of alternatives in terms of each criteria (Dağdeviren, 2008).

Steps of PROMETHEE method can be summarized as below (Dağdeviren, 2008):

a) Alternatives, criteria and criteria weights (W_j) are determined by decision maker. For l criteria

$$\sum_{j=1}^{l} w_j = 1 \tag{10}$$

b) After weights are identified preference functions for each criteria translating difference between evaluations of two alternatives (c and d) in terms of particular criterion, into preference degree ranging from 0 to 1 are defined. For this purpose, a preference function (P) is selected (Dağdeviren, 2008). Brans and Vincke (1985) proposed six basic preference functions (Usual type function, U-shape function, V-shape function, level function, linear function, Gaussian function) to ease the selection process. At most two parameters (p,q or s) should be arranged for these preference functions.

$$P_{j(c,d)} = M_j\left[f_j(c) - f_j(d)\right] \; 0 \le P_{j(c,d)} \le 1 \tag{11}$$

According to the equation 11 M_j is non-decreasing function of deviation between $f_j(c)$ and $f_j(d)$, $P_{j(c,d)}$ is preference function associated with $f_j(i)$. PROMETHEE based on pairwise comparisons considers deviation values of two alternatives under any criteria. Preference value is directly proportional to deviation values of two alternatives (Brans & Mareschall, 2005).

Indifference threshold (q) is the largest difference value decision maker can neglect on that criteria. Preference threshold (p) is the smallest difference value decision maker consider decisive in preference of one alternative over other. Gaussian threshold (s), used in Gaussian preference function, arranged as intermediate value between q and p (Dağdeviren, 2008).

c) After determining preference functions overall preference index ($\pi(c,d)$) is generated as below:

$$\pi(c,d) = \sum_{j=1}^{l} w_j P_{j(c,d)} \tag{12}$$

According to equation 12 $\pi(c,d)$ is overall preference index of cover d.

d) In order to rank alternatives after overall preference index generation priority flows (positive and negative) are determined as below:

$$\phi^+(c) = \sum_{x \in B} \pi(x,c) \tag{13}$$

$$\phi^-(c) = \sum_{x \in B} \pi(c,x) \tag{14}$$

According to equation 13 $\phi^+(c)$ or leaving flow is measure of outranking character of c over other alternative set B. According to equation 14 $\phi^-(c)$ or entering flow is a measure of outranked character of c over other alternative set B.

e) After priority flows are determined partial ranking of alternatives are obtained via PROMETHEE I method. According to PROMETHEE I if alternative c has greater leaving flow or smaller entering flow than d then alternative c is preferred to alternative d indicated as cPd.

$$\begin{aligned}
&\phi^+(c) > \phi^+(d) \text{ and } \phi^-(c) < \phi^-(d) \text{ or} \\
&\phi^+(c) > \phi^+(d) \text{ and } \phi^-(c) = \phi^-(d) \text{ or } \Rightarrow cPd \\
&\phi^+(c) = \phi^+(d) \text{ and } \phi^-(c) < \phi^-(d)
\end{aligned} \tag{15}$$

In case of having equal leaving and entering flows PROMETHEE I method provide indifference situation stated as cId.

$$\phi^{+}(c) = \phi^{+}(d) \text{ and } \phi^{-}(c) = \phi^{-}(d) \Rightarrow cId \quad (16)$$

Also PROMETHEE I method allows incomparable situation for alternatives (c and d) in some cases stated as cRd in equation 17:

$$\phi^{+}(c) > \phi^{+}(d) \text{ and } \phi^{-}(c) > \phi^{-}(d) \text{ or } \Rightarrow cRd \quad (17)$$

$$\phi^{+}(c) < \phi^{+}(d) \text{ and } \phi^{-}(c) < \phi^{-}(d)$$

f) After obtaining partial ranking via PROMETHEE I net flow values (ϕ^{net}) are calculated and complete ranking of alternatives is gained in terms of net flow values via PROMETHEE II method. Alternative having higher net flow is considered as superior to lower one and they are ranked from the best to the worst one. PROMETHEE II can not ensure creation of incomparable alternatives as distinct from PROMOTHEE I.

$$\phi^{net}(c) = \phi^{+}(c) - \phi^{-}(c) \quad (18)$$

$$\phi^{net}(d) = \phi^{+}(d) - \phi^{-}(d) \quad (19)$$

4. RESULTS

Purpose of this study is to assess the properties of AHP-PROMETHEE methodology in terms of evaluating the performance of 9 securities investment trusts listed in BIST by the help of financial ratios composing 5-year data set (2011-2015). So, financial ratios of each security investment trust listed in BIST are calculated. Seven financial ratios namely currency, cash, leverage, asset turnover, net profit/total assets, net profit/capital and net profit/net sales are considered. Then a survey evaluating the financial ratios was designed and applied for determining the weights of criteria and sub criteria. For this purpose, Saaty's 9-point scale was used to weigh criteria and subcriteria in multilevel hierarchical structure. Survey was applied between the dates 15 May 2016 and 25 May 2016 in order to obtain weights. While defining the criteria researchers made a depth literature review in order to develop the draft of the scale.

Respondents were selected from financial experts worked in universities, public and private sector. Experts' opinion provides the content validity. Experts opinion provide the content validity of the survey. As a result, 18 complete surveys were collected and analyzed via AHP approach using Super Decisions software.

According to the results of AHP approach weights of ratios are given in Table 3. For all comparisons consistency ratios are under the 0.1 threshold level so comparisons made were consistent. After the weights of criteria and sub criteria are determined, criteria related values of 9 securities investment truts listed in BIST within the period of 2011-2015 are obtained from the Public Disclosure Platform and firms' websites. In order to rank securities investment trusts via PROMETHEE method Visual PROMETHEE software was used.

Financial Ratios	Weights
Currency Ratio	0.051985
Cash Ratio	0.203843
Leverage Ratio	0.26699
Asset Turnover Ratio	0.18766
Net Profit / Total Assets	0.071109
Net Profit / Capital	0.102379
Net Profit / Net Sales	0.116021

Table 3: Weights of ratios

Source: own research

According to the importance level of financial ratios leverage ratio was found as the most important criteria having the value of 0.26699. On the other hand, currency ratio was obtained as the least important one having the value of 0.051985.

Before using PROMETHEE method linear preference function is defined for all of criteria in order to rank alternatives. Indifference (q) and preference (p) thresholds defined by decision makers' with respect to each criterion and given as Table 4:

Firms	2011		2012		2013		2014		2015	
	q	p	q	p	q	p	q	p	q	p
Currency Ratio	100	210	100	210	200	420	100	210	75	150
Cash Ratio	30	90	10	30	40	120	10	30	8	24
Leverage Ratio	0.01	0.04	0.01	0.04	0.005	0.02	0.02	0.08	0.02	0.09
Asset Turnover Ratio	3.5	10.5	3	9	3	9	3	9	3	9
Net Profit / Total Assets	0	0.03	0.03	0.09	0.02	0.06	0.05	0.15	0.007	0.021
Net Profit / Capital	0.03	0.12	0.05	0.2	0.01	0.04	0.02	0.08	0.003	0.012
Net Profit / Net Sales	0	0.04	0.009	0.04	0.01	0.04	0.002	0.008	0.002	0.008

Table 4: Indifference (q) and preference (p) thresholds

Source: own research

Phi (Φ) values of each alternative and their rankings within the period of 2011-2015 are acquired via PROMETHEE methodology and given in Table 5.

Firms	2011		2012		2013		2014		2015	
	Phi	Rank	Phi	Rank	Phi	Rank	Phi	Rank	Phi	Rank
ATLAS	-0.325	8	0.050	3	-0.349	8	-0.533	9	-0.499	9
ECBYO	0.156	3	-0.153	6	-0.154	7	0.342	2	-0.324	8
EUKYO	0.242	2	-0.027	4	0.231	4	0.583	1	0.045	4
EUYO	-0.362	9	-0.085	5	0.328	1	-0.28	8	-0.024	6
ET YAT	0.035	4	-0.247	9	0.308	2	0.074	4	0.070	3
GRNYO	0.027	5	-0.167	8	-0.007	5	0.044	5	0.451	1
IŞYAT	0.256	1	0.261	2	0.234	3	0.074	3	0.345	2
OYAYO	-0.012	6	0.527	1	-0.122	6	-0.047	6	0.003	5
VKFYO	-0.018	7	-0.159	7	-0.468	9	-0.259	7	-0.066	7

Table 5: Phi (Φ) values and ranking of firms

Source: own research

According to the results of Phi (Φ) values different firms place the top position for each year. While IŞYAT places first in 2011, it is valid for GRNYO in 2015. That is true for OYAYO, EUYO and EUKYO for intermediate years respectively. Similarly, in the context of worst financial performance, different firms place on the last for each year. While EUYO places the last position in 2011, it is true for ATLAS in 2014 and 2015. That is valid for ET YAT and VKFYO for other two years respectively. Also some inconsistent outputs can be seen after applying PROMETHEE method. Firstly, while ATLAS places the third position for 2012, it places the last two one for other years. Similarly, ET YAT places the top four position apart from the year of 2012. Other securities investment trusts suffered from the inconsistent results can be indicated as EUYO and GRNYO.As a result while VKFYO and ATLAS placed the last three positions out of 2012, IŞYAT and EUKYO placed the top four one.

In addition to the phi values, sensitivity analysis provides stability intervals for each criterion and shown in following tables.

Criteria	Weight	Interval	
		Min	Max
Currency Ratio	0,051985	0,0000	100,0000
Cash Ratio	0,203843	0,0000	24,0500
Leverage Ratio	0,26699	25,62	29,88
Asset Turnover Ratio	0,18766	17,24	37,87
Net Profit/Total Assets	0,071109	3,28	9,09
Net Profit/Capital	0,102379	6,95	11,45
Net Profit/Net Sales	0,116021	10,38	12,87

Table 6: Stability Intervals for 2011

Source: own research

According to the sensitivity analysis made for 2011, net profit/net sales and leverage ratio have the great impacts on complete ranking.

Criteria	Weight	Interval	
		Min	Max
Currency Ratio	0,051985	0,0000	100,0000
Cash Ratio	0,203843	18,15	22,32
Leverage Ratio	0,26699	26,47	31,27
Asset Turnover Ratio	0,18766	12,83	32,10
Net Profit/Total Assets	0,071109	1,43	7,82
Net Profit/Capital	0,102379	4,38	10,66
Net Profit/Net Sales	0,116021	6,73	12,55

Table 7: Stability Intervals for 2012

Source: own research

According to the stability intervals made for 2012, cash ratio and leverage ratio have the great impacts on complete ranking.

Criteria	Weight	Interval	
		Min	Max
Currency Ratio	0,051985	0,0000	100,0000
Cash Ratio	0,203843	0,0000	100,0000
Leverage Ratio	0,26699	26,62	35,49
Asset Turnover Ratio	0,18766	0,0000	19,85
Net Profit/Total Assets	0,071109	0,0000	7,40
Net Profit/Capital	0,102379	6,20	11,15
Net Profit/Net Sales	0,116021	3,84	13,12

Table 8: Stability Intervals for 2013

Source: own research

Criteria namely net profit/capital and net profit/total assets can be considered as effective on the complete ranking via sensitivity analysis made for 2013.

Criteria	Weight	Interval	
		Min	Max
Currency Ratio	0,051985	4,76	19,68
Cash Ratio	0,203843	0,0000	20,02
Leverage Ratio	0,26699	26,98	63,76
Asset Turnover Ratio	0,18766	8,59	19,03
Net Profit/Total Assets	0,071109	6,98	8,90
Net Profit/Capital	0,102379	6,74	10,02
Net Profit/Net Sales	0,116021	11,98	15,45

Table 9: Stability Intervals for 2014

Source: own research

According to the Table 9 net profit/total assets and net profit/capital have impacts on complete ranking.

Criteria	Weight	Interval	
		Min	Max
Currency Ratio	0,051985	0,0000	100,0000
Cash Ratio	0,203843	13,65	30,13
Leverage Ratio	0,26699	24,94	28,97
Asset Turnover Ratio	0,18766	15,14	21,67
Net Profit/Total Assets	0,071109	4,55	10,60
Net Profit/Capital	0,102379	5,41	11,93
Net Profit/Net Sales	0,116021	8,17	14,35

Table 10: Stability Intervals for 2015

Source: own research

Lastly leverage ratio and net profit/total assets affect the ranking of securities investment trusts in 2015. There can be make deduction in terms of stability intervals for analyzed period. While leverage ratio has an impact on firms complete ranking 2011,2012 and 2015, it is valid for net profit/total assets in 2013,2014 and 2015 respectively. Also criterion namely net profit/capital does not have large stability interval and have influence on complete ranking for the years of 2013 and 2014.

GAIA plane can be used for visual representation of complete ranking of PROMETHEE results. Also conflicts between criteria and the quality of alternatives in terms of each criterion is determined by this plane. Quality of GAIA plane for 2013 is %92.3, it is better than other years and this means that only %7.7 of information gets lost by projection. GAIA plane for 2013 is shown in the following figure:

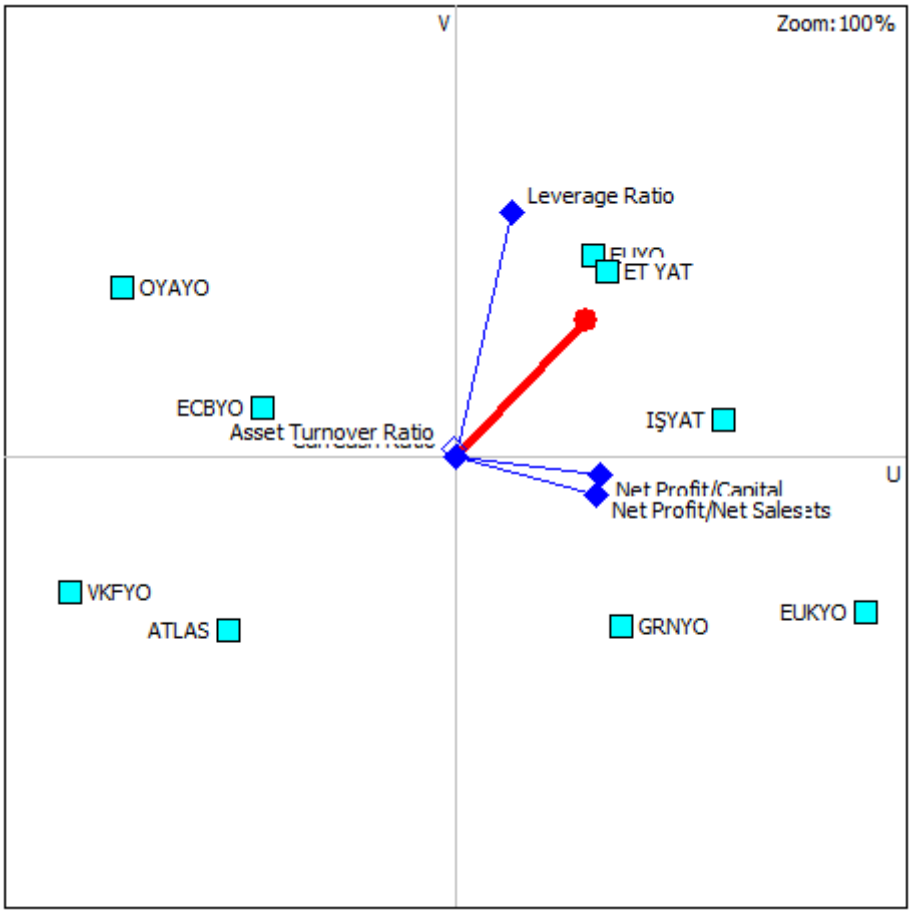


Figure 1: GAIA plane for 2013

Source: own research

According to the Figure 1 criteria namely net profit/capital, net profit/total assets and net profit/net sales are relatively close to each other that express similar preferences. Also cluster composing asset turnover, cash and currency ratio express similar preferences in securities investment trusts analyzing. Leverage ratio, expressing different preferences, seems to be conflicting with other criteria. It can make deduction for quality of securities investment trusts in terms of financial ratios. For example, while EUYO and ET YAT are good on leverage ratio, GRNYO and EUKYOare good on net profit/capital, net profit/net sales and net profit/total assets for 2013. Decision axis (vector pi) shown as thicker red axis indicates the direction of compromise and used for evaluating securities investment trusts in that direction. Alternatives namely EUYO, ETYAT and IŞYAT are the closest ones to decision axis and that is consistent to the results of PROMETHEE II complete ranking shown in Table 4. Also ATLAS and VKFYO are the opposite direction of decision axis so they placed as the last two position according to the complete ranking which is consistent with GAIA plane.

5. CONCLUSIONS AND FUTURE RECOMMENDATIONS

Purpose of this study is to evaluate the financial performance of nine securities investment trusts traded in BIST via AHP-PROMETHEE methodology by using the data sets of financial ratios. According to the results of AHP approach leverage ratio was found as the most important criteria. In addition to that securities investment trusts are analyzed by using PROMETHEE method and linear preference function. Indifference (q) and preference (p) thresholds are defined by decision makers'

according to the data sets. According to the ranking results of securities investment trusts, while VKFYO and ATLAS placed the last three positions out of 2012, IŞYAT and EUKYO are placed as the top four ones within the period of 2011-2015. Financial performance rankings made according to PROMETHEE method are subjective based and therefore rankings can be changed according to the preferences of decision makers. For further researches financial performance ranking of securities investment trusts can be made according to other MCDM methods in which preferences of decision makers' are not effective for alternative ranking. Also different weighting techniques can be integrated with these methods and the results of that are compared.

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