LATVIAN PENSION FUNDS: MULTI-CRITERIA ANALYSIS AND CONSUMER ASSESSMENT

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Abstract. This article describes the task of multi-criteria analysis of pension funds of Latvian Republic, determines the main features of this task and gives grounds for the feasibility of using multi-criteria decision analysis (MCDA). The fields of using multi-criteria decision analysis in business are reviewed. Analytic Hierarchy Process (AHP) approach in the studies of Latvian and Lithuanian researchers is reviewed as well. The study investigates the age portrait of fund members and possible economic motivation of pension funds choice from consumers' point of view. Multi-criteria analysis of pension funds is conducted by using the criteria employed in creating rating funds based only on public information.

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Reikšminiai žodžiai: daugiakriterinė analizė, pensijų fondai, įverčių principai, Latvija.

Introduction

In the circumstances of the current crisis consumers of financial services face the crucial problem of financial partner stability and many factors should be taken into account while choosing this partner. Lack of reliability of state insurance services may induce residents considering the opportunity of getting additional services and Latvian residents may find it urgent to choose a pension fund as a partner in providing their pension funds. In the process of deciding on a pension fund the client should take into account a number of factors: positive business reputation activities without losses, financial stability, and investment potential. This choice of partner may be carried out by using methods of multi-criteria analysis.

The object of research is decisionmaking on the choice of a pension fund in Latvian Republic. The subject of research is application of the method of multi-criteria assessment by using expert examination. The research is carried out on the basis of actual data: Latvian pension funds for 2009-2010. This study uses the multi-cri-

teria analysis approach to prioritize the critical factors and the sub-factors of selecting a pension fund. We use the analytic hierarchy process approach to research the impact of consumer preferences in choosing a pension fund. Selection of criteria and sub-criteria is based on the analysis of literary sources and the author's personal experience.

The paper proceeds as follows: after the introduction in Section 1 a bibliometric investigation about multi-criteria decision-making is conducted on the basis of studies mainly implemented in Latvia and Lithuania. Next, in Section 2 a brief outline of the situation with private pension funds in Latvia is given, a methodical approach to the evaluation and selection of pension funds is described, as well as a hierarchical scheme of selection of a secure pension fund is presented. Then, Section 3 contains a case study on the assessment of Latvian pension funds. The conclusion contains findings and outcomes.

1. Characteristics of practical application of multiplecriteria decision making (MCDM) in business

The Analytic Hierarchy Process (AHP) has been developed by T. Saaty (1977, 1980, 1980, 1994) [22, 23, 24, 25] and is one of the best known and most widely used MCDM approaches. AHP is a powerful and flexible weighted scoring decision-making process to help people set priorities and make the best decision. Some researchers (Hajeeh &Al-Othman) [12] evaluate AHP as intuition method, others (Cheng&Li) [13] as subjective technique, irrespective of 5 main drawbacks (Saaty, [26]), this method is widely used for making multicriteria decisions in scientific research and in industrial practice.

Multi-criteria assessment in decision-making in economic-financial field and rating assessment of economic subjects is intensely used. Based on the data of bibliometric investigation about multiplecriteria decisionmaking (MCDM) and multiatribute utility theory (MAUT) using the ISI database over the 5-year period (2002-2006), the authors of the research [33] notice the increase of numbers of MCGM/MAUT publications along with the growth of management science/operations research publications (MS/OR). The authors of bibliometric investigation [33] notice the reduction of relative share of OR/MC, management and business topics by about 40%, however, the share of computer science has increased by some 20%, environment has doubled, but all engineering areas have increased too.

The method of analysis of hierarchies is an interdisciplinary field of science. We conduct a review of practical application of MCDM in the research performed by Latvian and Lithuanian scientists.

In Latvia, there is much research in the field of information fusion in decision-making under uncertainty (Borisovs&Vališevskis [6], Valisevskis [30]) and there are practical examples of using this method in different spheres of business. The author conducted a bibliometric research of publications on a given theme in Latvia. The

range of research is relatively wide: from using AHP in founding the choice suitable for freezing raspberries, black and redcurrant berries (Kampuse [15]), developing information system for the choice of tourist routes (Romanov [21]) and rating of insurance company reliability (Voronova [31], Voronova&Pettere [32]) to applying AHP in solving problems of national security (Melderi [17]). V. Dreimanis [9], by using a multi-criteria approach to develop the methodology for determination of risk as a part of logistics management. This methodology is proven on a sample of assessment of a driver's risk en route.

Barashkina I. [5] applied AHP for deciding on the most significant value chain component and priority regarding the implemented activities for promotion of organic farming market development. R. Shulca [29] applied AHP to assess alternatives of development of internal audit of Latvian local authorities. D. Shtefenhagena [28] used AHP in functional assessment of university activities. There are examples of using the AHP methods for solving industrial tasks. For example, it was used in an assessment of the alternatives of getting *biological hydrogen production* (Djano S. N. [8]) and for comparing milk production technologies (Zujs V. [35]).

The practical approach in using multi-criteria decision analysis (MCDA (AH)) is obvious in the works of Lithuanian researchers, such as application of multiple-criteria analysis for complex assessment of factors of new construction companies' marketing environment (Žvirblis *et al.*[34]), the usage of Promethee method evaluating Lithuanian banks from the perspective of their reliability with regard to customer companies (Ginevičius *et al.*[10]) and selection of optimal option of investing in real estate (Ginevičius *et al.*[11]). Laurinavičius E. *et al.*[16] investigate the use of Analytic Hierarchy Process (AHP) and ELECTRE (*Elimination Et Choix Treduisantë La Realite*) for determining weighting ratios of factor criteria for assessing the efficiency of investment projects of business subjects claiming for investment support from the *EC by using the techniques of DEA*. Shevchenko, G. *et al.* [27] applied the elements of multi-criteria analysis for assessing the risks of alternative investment projects.

The introduced review testifies a wide range of application of the AHP method by all those who happen daily and sometimes 'wreck brains', searching for the best alternative between options.

2. Solution of the task of choosing a pension fund by using multi-criteria decision analysis (MCDA)

2.1 Pension fund choice: for and against

Latvian state renders services (social insurance) worth almost 1/3 of the salary and these services cannot be refused, however, obtaining this insurance service in the future is not guaranteed. Complex situation with social security budget in Latvia in 2011, when spending share exceeds income share, forces the government to spend social budget savings. If the situation fails to improve and no government decisions

are adopted in this field in 2012, the reserve may be used up to the last lat. In this case the problem of securing their retirement years becomes relevant for the Latvian residents.

Since 1998, three level pension schemes have been applied in Latvia. The third level – private voluntary pension scheme is already in operation. The aim of this scheme is the following: to contribute member funds by using an intermediary private pension fund and save additional capital for retirement. The typical feature of this scheme is only voluntary membership. Latvia has two private pension funds – open and closed ones. At present, private pension funds offer conservative and dynamic contribution strategies. Conservative contribution strategy is more secure, however, it brings less profit. In its turn, dynamic contribution strategy is risky but it is possible to save more. In 2009, the share of private pension fund members accounted for 16.3% of economically active Latvian residents.

According to the statistical data of the Financial and Capital Markets Commission as on the 31 December 2010, there were 7 private pension funds in Latvia, one of them is a closed pension fund and the rest are open pension funds. In total 21 pension fund is offered , they comprise 191.307 members and only 7 of them were nonLatvian residents. At the end of 2010, the total assets of the fund amounted to approximately LVL 114,329,000 [20]. Some private pension fund members are associated with low level of population solvency, low income and lack of creditworthy residents. A choice of a pension fund made by the investor from the point of view of potential clients and, therefore, the determination of the age structure of pension fund members is crucial. In her research the author studied the age structure of pension fund members based on 5 largest private pension funds (93% out of all Latvian fund members were covered and the dates refer to the end of 2010) (Fig. 1).
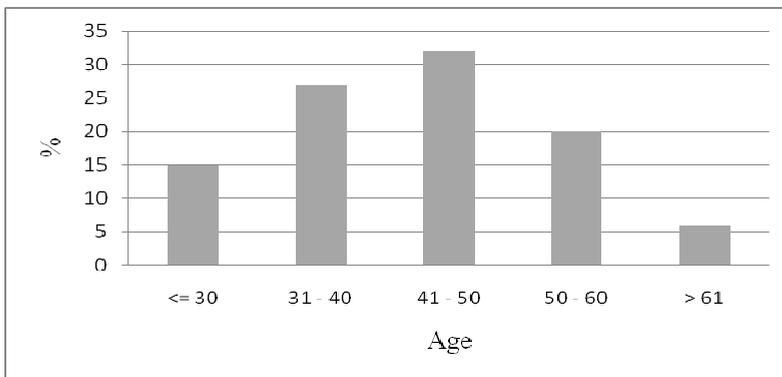

Fig. 1. Age structure of the Latvian largest private pension funds in 2010 [1, 2, 3, 4, 20]

It is possible to come to the conclusion that the age of most private pension fund members starts at 40 , this demonstrated that the 3-rd level pension fund is used mainly by people approaching their retirement age or who have reached it. Taking into account the abovementioned facts, the author divided the members of pension

funds into 3 groups: pension fund members with 15 or more years left to their retirement age (42%), members approaching their retirement age (42%) and members who have already reached retirement age (16%). A relatively large number of retired members can be attributed to the fact that, according to Article 10(5) of the Law On Personal Income Tax, contributions to private pension funds are considered legal income: 'the payments made into the private pension funds established in accordance with the Law on Private Pension Funds, or other private pension funds registered in other Member States of the European Union or of the European Economic Area, which do not exceed 10% of the annual taxable income of a person (in paragraph two of this Section – of the monthly gross remuneration for work, which is a remuneration for work of a calendar month prior to deduction of those amounts, for which, in conformity with this Law, the reduction of the taxable income of an employee is permitted, as well as prior to any deduction)'[18]. This means that for working pensioners, especially at the time of very low deposit rates, it is more reasonable to contribute to private pension funds (Personal Income Tax rate is 25%) rather than contribute spare money to deposits, taking into account the fact that when the retirement age is reached, it is possible to withdraw the money at any time and, in addition, get extra income once a year.

2.2. Solution Approach

It is consultants (specialists in the field of insurance, actuaries, analysts) who can assist in choosing a pension fund. They use special methods of actuarial analysis, ratings or otherwise service consumers decide on the choice of a pension fund, relying on their own knowledge and experience and using public information about fund activities. In both cases, indicators are used for assessing a pension fund, characterising the quality of work experience and fund reliability. Such financial indicators as volume of pension reserves, pension accumulation along with the indicators as to the number of members and insured persons give an impression about fund attractiveness for clients as well as fund's ability to carry out sound management and invest entrusted funds. It is feasible to use Analytic Hierarchy Process to carry out a complex assessment of a fund's attractiveness to a client.

Assessment of pension funds is carried out by using Analytic Hierarchy Process (AH) and consists of structuring alternatives *P* on criteria of cluster *G*. Then let us form a matrix of pair-wise comparisons for each level of hierarchy, elements of which are assessments of comparative importance of elements of a given level of hierarchy related directly to above standing element [7, 8]. Assessment of importance is carried out by means of comparing elements of a matrix column with a line element assessment of criteria and advantages of alternative a_{ij} (pension fund, P_i) before alternative P_j, is determined on nine point Saaty's linear scale: 1 - if this advantage is not available; 3 - if advantage is weak; 5 - if advantage is substantial; 7- if advantage is evident; 9 - if advantage is absolute; 2, 4, 6, 8 – interim comparative assessments. A general algorithm by making calculations completed in Excel is given in Fig. 2.
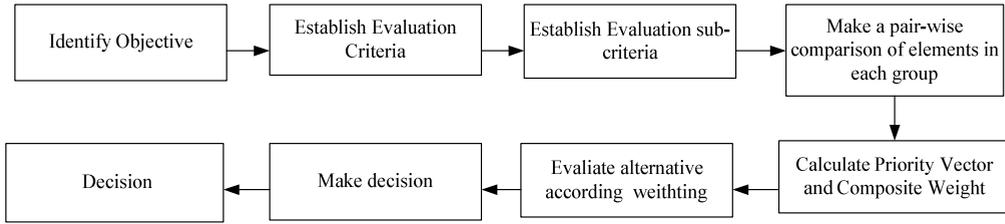
Fig. 2. Methodological approach to the evaluation and selection of a pension fund

2.3. Structuring the hierarchy for evaluation

Assessment of the choice of a pension fund is carried out by persons having a similar goal (provide for their own pension in the future), but their approach to assessment of investment potential differs. In order to carry out a complex assessment of attractiveness (rating), professional analysts may use 14 indicators, grouped into 4 criteria groups (Fig. 3). In order to determine the selection criteria for the choice of pension funds, the author took into account the impossibility of applying merely financial ratios, while conducting analysis of preference related to the activities of pension funds due to specific procedures of preparing financial statements of funds [19]. Two–level system of criteria is connected with the fact that if a large number of criteria (over 10) is used, the relevance of separate criteria in expert examination is lost.
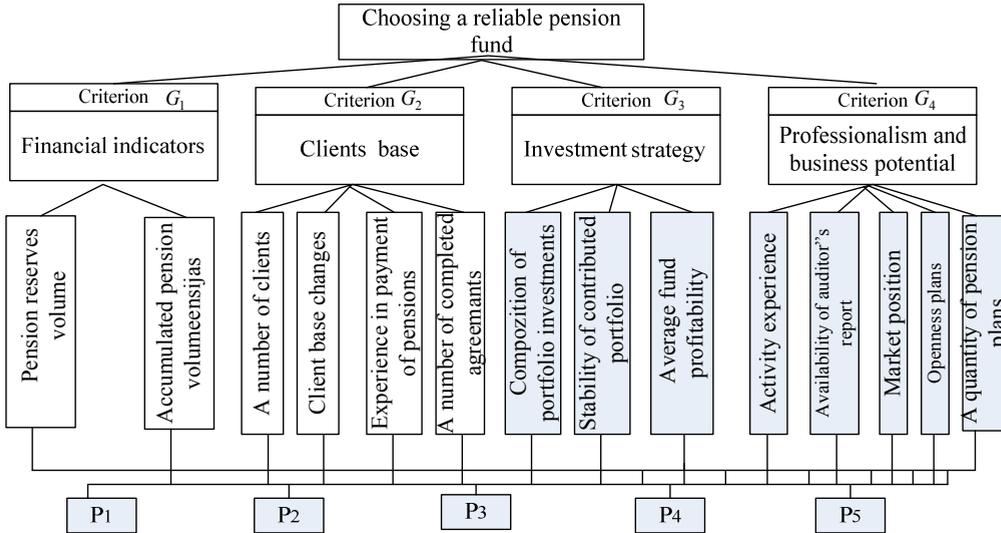

Fig. 3. Hierarchical scheme of selection of a secure pension fund

2.4. Constructing the pairwise comparison matrix and calculating the weights

Ratios of relative importance of criteria are determined by calculating the main own vectors conforming to the main or maximum own meaning of matrix of compari-

sons with consequent standardisation of this vector. For matrix A (Table 1) the following weights of criteria are obtained: $\alpha_1 = 0.2739$, $\alpha_2 = 0.0597$, $\alpha_3 = 0.5537$, $\alpha_4 = 0.1127$, and for subcriteria account for $\alpha_{11} = 0.833$, $\alpha_{12} = 0.167$, $\alpha_{21} = 0.162$, $\alpha_{22} = 0.313$, $\alpha_{23} = 0.394$, $\alpha_{24} = 0.131$, $\alpha_{31} = 0.163$, $\alpha_{32} = 0.235$, $\alpha_{33} = 0.602$, $\alpha_{41} = 0.035$, $\alpha_{42} = 0.483$, $\alpha_{43} = 0.240$, $\alpha_{44} = 0.044$, $\alpha_{45} = 0.199$.

Table 1. Paired comparison matrix A of criteria

Choice of pension plan	Financial indicators	Client base	Investment strategy	Professionalism and business potential
Financial indicators	1	6	1/4	5
Client base	1/6	1	1/5	1/4
Investment strategy	4	5	1	7
Professionalism and business potential	1/5	4	1/7	1

Thus, for making a decision, the most important group of criteria is the one characterising investment strategy (criterion No 3) and financial results (criterion No 1). The level of assessment of alternatives (pension funds) is identified by using the method of belonging based on pair-wise comparisons. For each pair of alternatives, by applying the criterion $G_j (i = 1, n)$ the advantage of one variant over another is assessed by using quantitative and qualitative information. Table 2 shows a fragment of expert statements, summed up in a matrix of paired comparisons. In each matrix, 14 elements correspond to paired comparisons. The rest elements are identified, having regard to the fact that a matrix of paired comparisons is diagonal and reverse symmetric.

Table 2. Paired comparisons of alternatives (fragment) on the Saaty's linear scale

Sub criteria	Paired comparisons
$\widetilde{G}_{11}$	Advantage of P_1 over P_2 is absent. Advantage of P_1 over P_3 is absent. Considerable advantage of P_1 over P_4. Considerable advantage of P_1 over P_5. Weak advantage of P_2 over P_3. Absolute advantage of P_2 over P_4. Considerable advantage of P_2 over P_5. Absolute advantage of P_3 over P_4. Considerable advantage of P_3 over P_5. Advantage of P_4 over P_5 is absent.
$\widetilde{G}_{12}$	Substantial advantage of P_1 over P_2. Substantial advantage of P_1 over P_3. Absolute advantage of P_1 over P_4. Absolute advantage of P_1 over P_5. Considerable advantage of P_2 over P_3. Considerable advantage of P_2 over P_4. Considerable advantage of P_2 over P_5. Absolute advantage of P_3 over P_4. Considerable advantage of P_3 over P_5. Weak Advantage of P_4 over P_5 is absent.

The following weights of subcriteria are obtained (Priority Vector):

$$\widetilde{G}_{11} = \left\{\frac{0.198}{P_1}, \frac{0.421}{P_2}, \frac{0,289}{P_3}, \frac{0.034}{P_4}, \frac{0.058}{P_5}\right\}, \qquad \widetilde{G}_{12} = \left\{\frac{0.509}{P_1}, \frac{0.119}{P_2}, \frac{0.095}{P_3}, \frac{0.028}{P_4}, \frac{0.249}{P_5}\right\};$$

$$\widetilde{G}_{21} = \left\{\frac{0.487}{P_1}, \frac{0.197}{P_2}, \frac{0.197}{P_3}, \frac{0.067}{P_4}, \frac{0.052}{P_5}\right\}, \qquad \widetilde{G}_{22} = \left\{\frac{0.217}{P_1}, \frac{0.507}{P_2}, \frac{0.038}{P_3}, \frac{0.183}{P_4}, \frac{0.057}{P_5}\right\};$$

$$\widetilde{G}_{23} = \left\{\frac{0.496}{P_1}, \frac{0.073}{P_2}, \frac{0.175}{P_3}, \frac{0.026}{P_4}, \frac{0.230}{P_5}\right\}, \qquad \widetilde{G}_{24} = \left\{\frac{0.293}{P_1}, \frac{0.055}{P_2}, \frac{0.330}{P_3}, \frac{0.024}{P_4}, \frac{0.298}{P_5}\right\}; \quad (1)$$

$$\widetilde{G}_{31} = \left\{\frac{0.390}{P_1}, \frac{0.067}{P_2}, \frac{0.067}{P_3}, \frac{0.101}{P_4}, \frac{0.375}{P_5}\right\}, \qquad \widetilde{G}_{32} = \left\{\frac{0.122}{P_1}, \frac{0.122}{P_2}, \frac{0.511}{P_3}, \frac{0.122}{P_4}, \frac{0.122}{P_5}\right\};$$

$$\widetilde{G}_{33} = \left\{\frac{0.195}{P_1}, \frac{0.568}{P_2}, \frac{0.137}{P_3}, \frac{0.040}{P_4}, \frac{0.060}{P_5}\right\}, \qquad \widetilde{G}_{41} = \left\{\frac{0.092}{P_1}, \frac{0.254}{P_2}, \frac{0.368}{P_3}, \frac{0.060}{P_4}, \frac{0.226}{P_5}\right\};$$

$$\widetilde{G}_{42} = \left\{\frac{0.2}{P_1}...\frac{0.2}{P_5}\right\}, \widetilde{G}_{43} = \left\{\frac{0.512}{P_1}, \frac{0.091}{P_2}, \frac{0.134}{P_3}, \frac{0.080}{P_4}, \frac{0.184}{P_5}\right\}; \widetilde{G}_{44} = \left\{\frac{0.175}{P_1}...\frac{0.175}{P_3}, \frac{0.376}{P_4}, \frac{0.1}{P_{54}}\right\}$$

$$\widetilde{G}_{45} = \left\{\frac{0.172}{P_1}, \frac{0.413}{P_2}, \frac{0.269}{P_3}, \frac{0.085}{P_4}, \frac{0.061}{P_5}\right\}.$$

From (1) it follows that there is no alternative (pension fund) dominating in any of the criteria, therefore, the decision will depend on the importance of these very criteria and sub-criteria. Taking into account the importance of sub-criteria, the following results are obtained:

$$\widetilde{G}_{11}^{0.833} = \left\{\frac{0.165}{P_1}, \frac{0.351}{P_2}, \frac{0,241}{P_3}, \frac{0.028}{P_4}, \frac{0.048}{P_5}\right\}; \widetilde{G}_{12}^{0.167} = \left\{\frac{0.085}{P_1}, \frac{0.020}{P_2}, \frac{0.016}{P_3}, \frac{0.005}{P_4}, \frac{0.042}{P_5}\right\};$$

$$\widetilde{G}_{21}^{0.162} = \left\{\frac{0.079}{P_1}, \frac{0.032}{P_2}, \frac{0.032}{P_3}, \frac{0.011}{P_4}, \frac{0.008}{P_5}\right\}, \widetilde{G}_{22}^{0.313} = \left\{\frac{0.067}{P_1}, \frac{0.158}{P_2}, \frac{0.012}{P_3}, \frac{0.057}{P_4}, \frac{0.018}{P_5}\right\};$$

$$\widetilde{G}_{23}^{0.394} = \left\{\frac{0.196}{P_1}, \frac{0.029}{P_2}, \frac{0.069}{P_3}, \frac{0.010}{P_4}, \frac{0.091}{P_5}\right\}, \widetilde{G}_{24}^{0.131} = \left\{\frac{0.038}{P_1}, \frac{0.007}{P_2}, \frac{0.043}{P_3}, \frac{0.003}{P_4}, \frac{0.039}{P_5}\right\};$$

$$\widetilde{G}_{31}^{0.163} = \left\{\frac{0.064}{P_1}, \frac{0.011}{P_2}, \frac{0.011}{P_3}, \frac{0.016}{P_4}, \frac{0.061}{P_5}\right\}, \widetilde{G}_{32}^{0.235} = \left\{\frac{0.029}{P_1}, \frac{0.029}{P_2}, \frac{0.120}{P_3}, \frac{0.029}{P_4}, \frac{0.029}{P_5}\right\}; \quad (2)$$

$$\widetilde{G}_{33}^{0.602} = \left\{\frac{0.118}{P_1}, \frac{0.342}{P_2}, \frac{0.082}{P_3}, \frac{0.024}{P_4}, \frac{0.036}{P_5}\right\}, \widetilde{G}_{41}^{0.038} = \left\{\frac{0.003}{P_1}, \frac{0.010}{P_2}, \frac{0.014}{P_3}, \frac{0.002}{P_4}, \frac{0.009}{P_5}\right\};$$

$$\widetilde{G}_{42}^{0.456} = \left\{\frac{0.091}{P_1}...\frac{0.091}{P_5}\right\}, \widetilde{G}_{43}^{0.242} = \left\{\frac{0.124}{P_1}, \frac{0.022}{P_2}, \frac{0.032}{P_3}, \frac{0.019}{P_4}, \frac{0.044}{P_5}\right\};$$

$$\widetilde{G}_{44}^{0.095} = \left\{\frac{0.017}{P_1}...\frac{0.017}{P_3}, \frac{0.036}{P_4}, \frac{0.010}{P_5}\right\}; \widetilde{G}_{45}^{0.169} = \left\{\frac{0.029}{P_1}, \frac{0.070}{P_2}, \frac{0.045}{P_3}, \frac{0.014}{P_4}, \frac{0.010}{P_5}\right\}.$$

Let us sum up the results, taking into account the importance of criteria and fuzzy, showing how fully the alternatives (pension funds) P_1, P_2 ... P_5 *meet the criteria* G_1, G_2,

G_3 *and* G_4 (see Table 3). Graphs of functions showing the belonging of alternatives are presented in Fig. 2. According to the priority criterion G_3 (investment strategy), the most preferable is pension fund P_2, as to the second priority criterion G_1 (financial results), the most preferable is also pension fund P_2. Taking into account multi-criteria assessment, it is possible to formulate a number of preferences:

$$P_2 > P_1 > P_3 > P_5 > P_4 . \tag{3}$$
$$\underset{(0.350)}{} \quad \underset{(0.237)}{} \quad \underset{(0.220)}{} \quad \underset{(0.122)}{} \quad \underset{(0.070)}{}$$

Table 3. Results of the evaluation of pension funds, using multi-criteria approach

Pension funds	Assessment of the pension fund				Assessment of preference fund (composite weight)	Rank
	G_1	G_2	G_{31}	G_4		
	0.274	0.060	0.554	0.113		
P_1	0.250	0.380	0.210	0.264	0.237	II
P_2	0.371	0.226	0.382	0.209	0.350	I
P_3	0.257	0.156	0.213	0.200	0.220	III
P_4	0.033	0.081	0.069	0.163	0.070	V
P_5	0.090	0.156	0.126	0.164	0.122	IY
Total	1.000	1.000	1.000	1.000	1.000	

3. Case study of the assessment Latvian pension funds

3.1 An example of the choice of a pension fund by an investor

When deciding on their choice, consumers of pension fund services rely on principles of Occam's razor and KISS (Keep It Simple, Stupid). A consumer will not use a large number of criteria and will not make a number of comparisons. Taking into account the age structure of fund members, the author comes up with a hypothesis on the necessity to reduce a number of criteria counted in the process of choosing a pension fund. In order to make a decision on the choice of a pension fund, a potential consumer of this service assesses its ability to attract (market activity - G_1) and allocate funds (investment activity - G_2).

A graphic model of the criteria of choosing a pension fund and information about the activity results of 2010 are presented in Figure 4. Summing up the totals (Table 4), it is clear that there are 3 pension funds in Latvia possessing the necessary ability to involve new clients and having sufficient profitability indicators. Since the assessment is based on 2 level models, it is possible to come to the conclusion on their separate parts, for example, market activity and investment activity indicators. The 1 pension fund has the highest assessment of both indicators. Provided that invest-

ment activity in pension funds P_2 and P_3 is actually similar, market activity is higher with pension fund P_2.
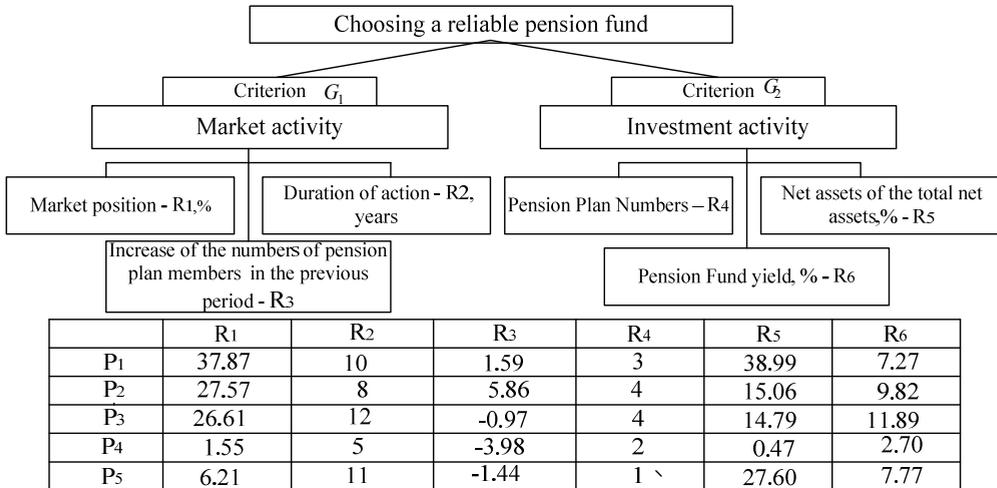
	R1	R2	R3	R4	R5	R6
P1	37.87	10	1.59	3	38.99	7.27
P2	27.57	8	5.86	4	15.06	9.82
P3	26.61	12	-0.97	4	14.79	11.89
P4	1.55	5	-3.98	2	0.47	2.70
P5	6.21	11	-1.44	1	27.60	7.77

Fig. 4. Hierarchical scheme of selection of a secure pension fund

Table 4. Evaluation of pension funds from the perspective of the individual user (with principles of Occam's razor and KISS)

Pension funds	Fund assessment based on criteria		Assessment of preference fund (composite weight)	Rank
	G_1	G_2		
	0.333	0.667		
P_1	0.366	0.268	0.301	I
P_2	0.245	0.239	0.241	II
P_3	0.196	0.240	0.225	III
P_4	0.044	0.115	0.092	V
P_5	0.148	0.138	0.142	IY
Total	1.000	1.000	1.000	

3.2 Investigation of stability of decisionmaking

Let us assume that a consumer of pension funds may change the level of advantage on indicator R_6 at the assessment of pension funds $P_1, P_2 ... P_5$ of current value into more optimistic (+1) or pessimistic (-1) assessment. For this purpose, let us change the values of matrix elements of coupled comparisons $A(R_6)$ and perform calculations according to the technique 'What – If' of the comparison analysis (Table 5). Calculation results are presented in Table 5.

The conducted 'What–If' analysis demonstrated that changes of the opinion of pension fund consumers, expressed in the level of advantage at R_6, did not change the overall assessment of pension funds. The given analysis demonstrates the stability of behaviour by consumers who aim at gaining income.

Conclusions

Peculiarities of assessment of pension funds with a view of providing public information not requiring calculation of indicators have been found. Multi-criteria analysis is conducted by way of pair-wise comparisons of pension funds, without using absolute values of criteria.

Table 5. Calculations of dependence of pension funds assessment on changes of paired comparison according to R_6

	A(R_6) - paired comparison matrix						$\widetilde{G}_{23}^{0.667}$	$\widetilde{P}$ (composite eight)	P
+1		P_1	P_2	P_3	P_4	P_5	$\left\{\dfrac{0.147}{P_1}, \dfrac{0.312}{P_2}, \dfrac{0.323}{P_3}, \dfrac{0.080}{P_4}, \dfrac{0.131}{P_5}\right\}$	$\left\{\dfrac{0.300}{P_1}, \dfrac{0.241}{P_2}, \dfrac{0.225}{P_3}, \dfrac{0.093}{P_4}, \dfrac{0.141}{P_5}\right\}$	P_1
	P_1	1	1/3	¼	5	1			
	P_2	3	1	¼	6	4			
	P_3	4	4	1	8	4			
	P_4	1/5	1/6	1/8	1	1/5			
	P_5	1	1/4	1/4	5	1			
0		P_1	P_2	P_3	P_4	P_5	$\left\{\dfrac{0.216}{P_1}, \dfrac{0.269}{P_2}, \dfrac{0.269}{P_3}, \dfrac{0.142}{P_4}, \dfrac{0.105}{P_5}\right\}$	$\left\{\dfrac{0.301}{P_1}, \dfrac{0.240}{P_2}, \dfrac{0.225}{P_3}, \dfrac{0.093}{P_4}, \dfrac{0.141}{P_5}\right\}$	P_1
	P_1	1	1/2	1/3	4	1			
	P_2	2	1	1/3	5	3			
	P_3	3	3	1	7	3			
	P_4	1/4	1/5	1/7	1	1/4			
	P_5	1	1/3	1/3	4	1			
-1		P_1	P_2	P_3	P_4	P_5	$\left\{\dfrac{0.204}{P_1}, \dfrac{0.248}{P_2}, \dfrac{0.277}{P_3}, \dfrac{0.094}{P_4}, \dfrac{0.177}{P_5}\right\}$	$\left\{\dfrac{0.302}{P_1}, \dfrac{0.239}{P_2}, \dfrac{0.224}{P_3}, \dfrac{0.093}{P_4}, \dfrac{0.142}{P_5}\right\}$	P_1
	P_1	1	1	1/2	3	1			
	P_2	1	1	1/2	4	2			
	P_3	2	2	1	6	2			
	P_4	1/3	1/4	1/4	1	1/3			
	P_5	1	1/2	1/2	3	1			

For compared funds which is more convenient for an expert. Subjective opinion at the stage of assessment actually does exist. The results of the research do not allow assessing the impact of individual preferences of potential customers of pension funds, taking into account the peculiarities related to age, sex and risk perception. A potential client may make an assessment by selecting a pension plan within the framework of the fund. However, taking into account the fact that this selection is carried out by different persons, it is advisable to change the criteria of assessment of preferences of pension

fund activities with regard to their investment attractiveness (both from the point of view of attraction potential and location potential).

The use of the analysis 'What–If' allows investigating the sensitivity of the decision to the variations of initial pair-wise comparisons of alternatives. The conducted analysis of the sensitivity of assessment of pension funds' attractiveness to consumers demonstrates the stability of choosing funds with higher investment assessment. AHP concept can assist a decision maker (consumer) in evaluating and selecting the best pension fund based on various decision criteria and sub-criteria.

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LATVIJOS PENSIJŲ FONDAI:
DAUGIAKRITERINĖ ANALYZE IR VARTOTOJŲ ĮVERČIAI

Irina VORONOVA

Santrauka. Straipsnyje apibūdinami daugiakriterinės pensijų fondų Latvijoje analizės tikslus, taip pat daugiakriterinių sprendimų analizės pritaikomumą, naudojant analitinio hierarchinio proceso nuostatas Latvijos ir Lietuvos tyrėjų darbuose. Apžvelgiamas pensijų fondų dalyvių amžius, galima jų pasirinkimo motyvacija. Daugiakriterė pensijų fondų analizė atlikta naudojant viešosios informacijos reitingavimo kriterijus

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