FINANCIAL DECISION-MAKING AMONG YOUNG ADULTS: AN AHP APPROACH

Tamara Kaftandzieva
Ph.D. Scholar at Department of Organizational Sciences (Management),
Ss. Cyril and Methodius University in Skopje
Faculty of Economics - Skopje
Republic of North Macedonia
tamara.kaftandzieva@gmail.com

Violeta Cvetkoska
Associate Professor at Department of Management,
Ss. Cyril and Methodius University in Skopje
Faculty of Economics - Skopje
Republic of North Macedonia
vcvetkoska@eccf.ukim.edu.mk

ABSTRACT

In an uncertain economic environment, the decision-making process regarding personal finances relies heavily on personal experience and behavior, and is largely influenced by a variety of psychological and socio-demographic factors. The aim of this paper is to analyze the key factors of the decision-making process regarding financial choices of the population of young adults in the Republic of North Macedonia, and to further explain young people's motives for the proposed decision and the conditions under which the decision was made. The research was conducted through an AHP-based questionnaire that was distributed to respondents ranging in age from 18 to 35 years. According to the obtained results, the respondents value financial security the most, hence their primary choice is investment in real estate and commodities. Young adults are less inclined to invest, especially in the more complex financial instruments. The developed AHP model will help young people make better, fact-based financial choices.

Keywords: financial decision-making; personal finance; young adult population; AHP

1. Introduction

Personal finance is the financial management which an individual performs over time, and encompasses various activities in order to meet personal financial goals, both short-term and long-term, by taking into account various risks and future life events. The process of making sound financial decisions is determined by a variety of factors. Therefore, spending, saving, and investment dynamics should consider the fulfillment of personal needs while taking into account financial constraints. People make various financial choices in accordance with their desires, motives, attitudes, affinities and goals, but mostly, their individual willingness to take risks. Contrary to the common belief that people are logical decision-makers, they in fact behave irrationally and are not able to

make fully informed decisions because they are highly susceptible to cognitive biases (Kahneman & Tversky, 1972). As financial decisions are often made in highly complex and uncertain situations that lack formal rules for decision-making, many conclusions rely on intuition (Kahneman et al., 1998).

Personal finance is a research area that is gaining momentum, especially when taking into account the increased interest in the concept of risk in the business environment. This is due to a greater awareness of risks after a series of corporate scandals, the global financial and economic crisis, as well as the current Covid-19 pandemic. Currently, this research area is immensely popular due to the intensified interest in incorporating psychology in economic sciences and answering the previously unanswered questions regarding human behavior.

The decision-making process itself is considered a cognitive process where investors make a decision based on various alternatives available to them. However, the researchers discovered that psychological and behavioral factors influenced decision-making to a large extent. The perception and processing of information about risk-return trade-off and the characteristics of the asset are at the core of the psychological aspects that lead to the process of making financial decisions. However, apart from the underlying information, the presence of psychological individual-specific factors influences investors' behavior and financial decision-making (Charness et al., 2010). Moreover, one of the most frequent associations between personal finance and financial education is with financial education; the underlying idea being that without adequate knowledge and skills, people cannot satisfactorily manage their own finances, particularly in a dynamic and complex environment (Carlin et al., 2012; Lusardi, 2008). Financial decision-making is indeed limited by the practical possibilities of exercising financial choices and is immensely influenced by the domestic financial system and economic environment. The current study was conducted to identify whether young adults make personal finance decisions spontaneously or based on a plan and strategy, linking the process with the economic and the demographic developments in the country, and understanding what course of action is necessary to result in an improved outcome. This kind of information is immensely important in the efforts to reduce the intensity of anomalies and systematic deviations from rational judgment in the future. Hence, the main objective of our paper is to help the young adult population make better, fact-based financial decisions. The aim of this paper is to analyze the decision-making process regarding financial choices of the young adult population in the Republic of North Macedonia, and to further explain young people's motives for the proposed decision and the conditions under which such a decision was made by using the most popular multi-criteria decision-making (MCDM) method, the Analytic Hierarchy Process (AHP).

The AHP method has been used in the area of finance because it provides a means of structuring and decomposition of otherwise complex decisions, modeling daily real life problems with ease and simplicity, and developing transparent decisions while taking into account various aspects. Although decision-making regarding personal finance is inevitably based on quantitative data, the qualitative factors that shape subjective judgments should be considered as well, in order to avoid decision-making based on intuition. Therefore, the use of a method that allows the incorporation of qualitative measures into quantitative research is advised. The AHP allows the selection of the best

alternative out of a range of alternatives, by including both quantitative and qualitative criteria into the decision-making process. The above justifies the methodological correctness of AHP application for the construction of a model that determines the financial decision-making of young adults. On the other hand, the process may be time-consuming, requiring too much effort and human input. Therefore, the decision-maker should use suitable tools to evaluate and solve a particular situation or problem, keeping in mind both the internal and external factors and variety of qualitative and quantitative information integrated therein (Saaty, 2012).

The developed AHP model may be used by a developing country's young adult population to choose the best financial option. Additionally, academics and scholars with an interest in AHP-personal finance may use this model for their own study. Also, this research contributes to the AHP-personal finance literature, which is critical for developing nations with low levels of financial literacy.

The rest of the paper is structured as follows: Section 2 provides a literature review of the MCDM and AHP studies in the field of finance; the AHP methodology used in the analysis is introduced in Section 3, while the results are discussed in Section 4; and Section 5 provides a conclusion and directions for further research.

2. Literature review

The first bibliographic survey related to the application of MCDM in finance covered 265 references from 1955 to 2001 and found that most are focused on the field of portfolio analysis and general financial planning (Steuer & Na, 2003). The MCDM approaches complement and enhance the existing normative and descriptive models in financial decision-making, primarily in the field of portfolio selection (Zopounidis & Doumpos, 2013). The study by Zopounidis et al. (2015) covered the period from 2002 to 2014, thus indicating that portfolio management remains the most popular area, apart from the interest that new issues have attracted, with China dominating the output in terms of the greatest number of authors and where they work. Almeida-Filho et al. (2020) confirmed the findings of earlier literature reviews, indicating that portfolio optimization and the problem of ranking continue to be the areas where studies are most likely to tackle multi-criteria approaches. Furthermore, they point out that applications of MCDM analysis in finance have increased, which was particularly noticeable after the global economic crisis in 2008, when making more informed and transparent decisions emerged as an imperative, thus growing exponentially and reaching a peak in 2018. However, the fields of management science, economics, accounting, and finance remain underexplored, mainly due to the complex networks of interdependencies and lack of agreement on the priorities that shape the decision-making process, especially in dynamic and turbulent environments (Franek & Kashi, 2014; Goyal et al., 2020).

Taking into account the theoretical framework, the immense popularity of the MCDM methodologies in the past several years has been evident, with the AHP method growing at a very fast pace. In light of that, Mardani et al. (2015) emphasized the importance of the AHP as the most prominent and most used method, as it was applied in 128 of 393 papers MCDM papers that were analyzed. In addition, its original founder, Thomas L. Saaty, is the most cited author in the field of research (Goyal et al., 2020). The

conclusions of the aforementioned literature reviews were supported by Khan and Ali (2020), who explored 920 articles in the period from 2000 to 2019, further proving the preference of researchers for the AHP method to resolve complex scenarios based on multiple different criteria and choose the best and most efficient alternative based on the obtained priorities. They found that the distribution of AHP publications by country showed it is predominantly applied in Turkey, followed by China and India, whereas North Macedonia is among the countries with the lowest AHP publications.

The AHP has been applied in numerous areas of finance including real estate, when considering several criteria prior to buying a house or an apartment (Obeidat et al., 2018); development of a credit scoring model, when evaluating the creditworthiness of SMEs (Roy & Shaw, 2021); sustainable local development, with performance of a SWOT analysis on the best strategies for implementation of a complementary monetary system (Escobar et al., 2020); and efficient allocation of scarce capital resources (Zopounidis et al., 2018). However, our particular interest lies in studies on the application of the AHP in financial decision-making regarding investment strategy selection and personal finance. According to Anthony and Joseph (2017), investors' decision-making is adversely affected by various psychological/behavioral factors, i.e., investors are most greatly influenced by over-confidence bias and regret aversion. Wu et al. (2012), in their study on selection of the best investment alternative of fund investment, bonds investment, stock investment, and real estate investment, adopted the AHP methodology mainly because the wisdom of the group eliminates bias generated by personal preferences, thus improving evaluation accuracy. The study concludes that the best investment strategy is real estate investment, followed by stock strategy and fund strategy, while the worst investment is bonds investment. The findings from Gawlik's paper (2019) focused on the younger generation; the target group was composed of 14 respondents from a sample of 200 university students. The focus on the quality of life determinants indicated that the criteria respondents value the most are safety, stability and certainty.

As earlier noted, the AHP method is one of the most popular MCDM methods and its popularity is constantly rising, mainly due to its flexibility and versatility, which has enabled it to be combined with various other techniques instead of as a stand-alone tool (Vaidya & Kumar, 2006). This is especially important since the complexity of financial decision problems often necessitates the use of an arsenal of analytical approaches. In light of that finding, Pradhan et al. (2019) reviewed the literature on the AHP integrated with DEAHP published between 2000 and 2018, and concluded that due to its high accuracy, the integrated DEAHP approach is widely applied in the field of performance and efficiency measurement, optimization and ranking of different products or services in a variety of sectors. However, when proposing hybrid and integrated methodologies, special care should be given to keeping the resulting models as simple and user-friendly as possible. Sophisticated analytic methodologies are not often used in practice because they are far too time-consuming and complex for financial decision-makers to understand (Zopounidis et al., 2015).

Despite the rising popularity of the topic, we identified a lack of literature dealing with the application of the AHP methodology in personal finance focused predominantly on the young adult population, which motivated us to take a step forward and contribute to

its enrichment. We searched the SCOPUS database by article title, abstract, and keywords for the terms personal finance, AHP, and decision-making over an all-year period (from the first publication in the SCOPUS database until April, 2021). However, no papers were identified for this purpose. We also performed a search in the Web of Science Core Collection database on the topic of personal finance and AHP and decision-making between 1900 and (April) 2021. The lack of any papers considering the problem explained in our paper further highlights the originality of our research. Furthermore, we decided to conduct the study in the Republic of North Macedonia since our goal was to examine this issue in a developing country; the Republic of North Macedonia gained monetary and financial independence in 1992 and their financial system is bank-based.

3. Methodology

The Analytic Hierarchy Process is a mathematical method for problem-solving that is widely used in multi-criteria decision-making for tackling multi-layered problems in real situations, primarily due to its ability to analyze both qualitative and quantitative criteria (Saaty, 1980). The basic model consists of three main parts comprising a hierarchy structure as follows: first, setting a goal that needs to be solved; second, selecting the criteria (with the possibility of further breaking them down to the level of sub-criteria); and third, defining the alternatives that need to be evaluated based on the criteria selected (Saaty, 2012).

According to Saaty (2012), the essence of the AHP method is that both the human judgments and the underlying information can be used in the evaluations and converted into numerical values that can be processed and compared over the entire range of the problem. Namely, a numerical weight or priority is derived for each element of the hierarchy through pair-wise comparison, allowing diverse and often incommensurable elements to be compared to one another in a rational and consistent way. The pair-wise comparison judgments are based on the relative importance or preference of the individual, using the fundamental scale developed by Saaty (2012). Decision-makers are asked to carefully compare the criteria in pairs regarding the goal and assign an intensity of importance from the Saaty's scale of relative importance with 9 degrees (Saaty & Kearns, 1991, p. 27). The question that should be asked in this comparison is how many times one criterion is more important than the other regarding the goal. The assigned intensity of importance is used to comprise the matrix of relative importance so that the more important criterion will obtain a proper whole number, while the other the reciprocal value. Then, the matrix of relative importance is normalized and the weight of each criterion is calculated as an average of values in each row of the normalized matrix. The procedure is repeated for the comparison of the alternatives regarding each criterion asking the question which alternative is preferred more regarding the criterion. For the alternatives, the local priorities are calculated in the same way as the weights of the criteria and are then synthesized into overall priorities. The overall priorities are used to rank the alternatives (the alternative with the highest overall priority will have a rank of 1, etc.).

Apart from individual decision-making, the AHP is designed for collaborative decision-making and problem-solving since a certain number of experts can find a solution close to the real-world situation (Saaty, 1986; Saaty & Peniwati, 2007). When AHP is used for

group decision-making, the geometric mean should be calculated for each comparison of the elements based on which matrix of relative importance will be filled (Aczel & Saaty, 2003). The AHP allows the consistency of decision-makers to be checked by calculating the consistency ratio (CR).

$$CR = \frac{CI}{RI} = \frac{\lambda_{\max} - n}{RI(n-1)}$$

where CI is the Consistency Index, RI is the Random Index, λ_{max} is the largest eigenvalue of the n-order matrix, and *n* is the number of compared elements in pairs, i.e., criteria and alternatives, separately. Based on the matrix size, there is a proper random consistency (Saaty & Kearns, 1991, p. 34). A value of the CR which is less than or equal to 10% is acceptable, and if it is higher, the decision-makers should revise their judgments.

The last step when applying the AHP is to conduct a sensitivity analysis which makes it possible to monitor how the change of the inputs (criteria, sub-criteria (if any)) affects the outputs (e.g. rank of the alternatives).

3.1 Research design

This paper is focused on selecting the relevant criteria that shape the financial choices of young people in the Republic of North Macedonia as well as defining the alternatives for reaching the goal of making a decision regarding personal finance. This justifies the methodological correctness of the AHP model and its application in decision-making regarding personal finance. Therefore, the development of the model was carried out in two independent phases.

In the first phase of the research, a questionnaire consisting of 11 questions was prepared (Appendix 1). This questionnaire was based on a well-known book in the area of personal finance by Ryan and Ryan (2015), a survey of financial literacy developed by the OECD (2011) and a Personal Financial Planning Questionnaire (2020) normally used when seeking financial advice, with the target group being young adults from 18 to 35 years of age. The first three questions ask about demographic information including gender, age, and level of education, while the rest of the questions focus on gaining information about the respondents' awareness, knowledge, skills, attitude, and behavior that are necessary to make sound financial decisions. The questionnaire was sent to 75 young adults by e-mail in February 2020; they were given one week to fill it in and send it back to the authors. This paper emphasizes the last three questions of the questionnaire with the aim of choosing the most important criteria when making a financial decision. Since the survey was conducted among individuals from 18 to 35 years of age, the alternatives were selected based on their common habits and preferences and the characteristics of the Macedonian financial system. Since all the respondents in this sample fall into the same category (the youth in the country), no major dispersion is expected in their habits and attitudes. Hence, 51 respondents who completed the questionnaire participated in creating the model and selecting the sub-criteria, criteria and the alternatives.

In the second phase of the research, an AHP questionnaire was created. This was used to develop a multiple-criteria AHP model where the sub-criteria are grouped into five criteria based on the obtained results from the first stage of the research (Questionnaire

1). Once the AHP model was developed and the hierarchy was designed, a subsample of 9 randomly chosen participants was invited to the second stage, where the ranking of each element of the hierarchy was performed. The respondents were asked the hypothetical question, how would they manage their money, supposedly having inherited 10,000 euros. The goal is to determine the financial decision-making among young adults while giving them the same starting point despite their different backgrounds and levels of income, which might influence the results. However, since the AHP has only recently been used among researchers in our country and since the procedure of answering the questions can be time-consuming, we were worried about the respondent's lack of knowledge regarding the model. Therefore, we decided to take a subsample of 9 participants by random sampling. Prior to completing the questionnaire, the respondents had been trained and the AHP method was explained to them via a Zoom meeting. The design of the questionnaire was specified for the AHP method, and the respondents conducted pair-wise comparisons across all possible combinations of reasons (Sato, 2009) using Saaty's scale of relative importance (Saaty & Kearns, 1991, p. 27).

First, they valued the alternatives with regard to each of the sub-criteria in pair-wise comparisons. For that purpose, 16 questions were developed (Appendix 2, Q1) for each of the sub-criteria respectively. Next, the sub-criteria were evaluated regarding the main criteria in 5 different questions for each of the criteria (Appendix 2, Q2). Finally, the criteria were evaluated in pair-wise comparisons with respect to the main goal (Appendix 2, Q3). Each of the respondents filled in a separate AHP questionnaire sent by e-mail and after completion they sent the results back to the authors. Although the process of filling out the questionnaire was quite complex and time-consuming, the respondents were able to express their preference for a particular alternative over the others. Taking into account that the design of the questionnaire reflects the results to a great extent (Sato, 2009), the design of an AHP-based questionnaire must be in that form in order to reflect the relative importance of alternatives to results.

Keeping in mind the group decision-making, the aggregation of perspectives was obtained by using a geometric mean as in Azcel and Saaty (1983). Each participant's questionnaire was solved in the Super Decisions software in order to determine the level of inconsistency. Since the software indicates the comparisons that seem most inconsistent, the 9 respondents were asked to review those judgments. Therefore, when necessary, the process was repeated, in order to keep the inconsistency below or equal to 10%. The developed model with the respective criteria, sub-criteria and alternatives was shown to the respondents who confirmed it, thus the decision-making was obtained by consensus.

4. Results and discussion

Out of the 75 distributed questionnaires, 51 responses were collected for a response rate of 68%. Out of 51 respondents, 29 are female and 22 are male. The majority of the respondents (27) are between 26 and 30 years of age, 16 respondents are between 18 and 25 years old, and 8 respondents are between 31 and 35 years old. Regarding their level of education, the largest number of the respondents have acquired higher education (35), 11 have MA degrees and 5 have finished high school. The answers to questions 4 and 5 were used to develop the alternatives in the AHP model. While the majority of the respondents

answered that they are familiar with each of the financial products (Appendix 1, Q4), none of them have recently held bonds, shares in pension funds, options or futures (Appendix 1, Q5), all of which were excluded from the multi-criteria analysis. Based on their characteristics, real estate and commodities were merged into one alternative. The aim of question 6 was to determine the respondents' attitude towards risk and finances and accordingly, their behavior. Twenty-three of the respondents are risk-averse (disinclined or reluctant to take risks), 16 are risk-neutral and 12 are risk-tolerant. Since information is very important in making a financial decision (decisions about saving, spending and investing), the majority of the respondents (18) rely on recommendations from independent financial advisors or brokers the most, product-specific information picked up in a branch or from sales staff (11), their own previous experience (9), and the advice of friends/relatives (6). Thirty-three respondents stated that their personal objective in making financial decisions is to provide a comfortable life, 7 stated that their goal is to provide for their family, 6 answered that their aim is to save regularly, and for the rest, the main goal is to make a major purchase. The remaining questions were developed in order to determine the sub-criteria and group them respectively into criteria for financial decision-making. When making a financial decision, given the investment objectives, the respondents pay the most attention to stability (the average grade of importance is 4.49), followed by information (4.47), return (4.27), liquidity (4.18), volatility (3.98), availability (3.98) and simplicity (3.61). Regarding the time frame, the majority of the respondents (33) prefer medium-term investments, 13 prefer short-term investments, while only 5 of the respondents prefer long-term investments. Considering the proposed personal characteristics, respondents pay the most attention to risk attitude (4.08), followed by level of income (3.71), financial education (3.69), ability to save money (3.45), financial priorities (3.35) and experience (3.22).

Based on the judgments of the 9 respondents, we developed a multi-criteria AHP model oriented towards financial decision-making. The hierarchy structure of our AHP model is shown in Figure 1. First, the respondents were asked to assess the following five criteria with the respective sub-criteria regarding the goal (how they make financial decisions regarding personal finances): profitability (return, liquidity and volatility); financial security (simplicity, availability, stability and information); time horizon (short-term, medium-term and long-term); personal characteristics (income, ability to save and financial priorities), and readiness (risk aversion, financial education and experience). Then, they were asked to evaluate the following alternatives as possible solutions to the proposed goal: saving in the form of a bank deposit, investments on the stock market, buying a life insurance policy, investments in mutual funds, and investments in real estate and/or commodities, with the goal being how you would invest a 10.000 EUR inheritance.

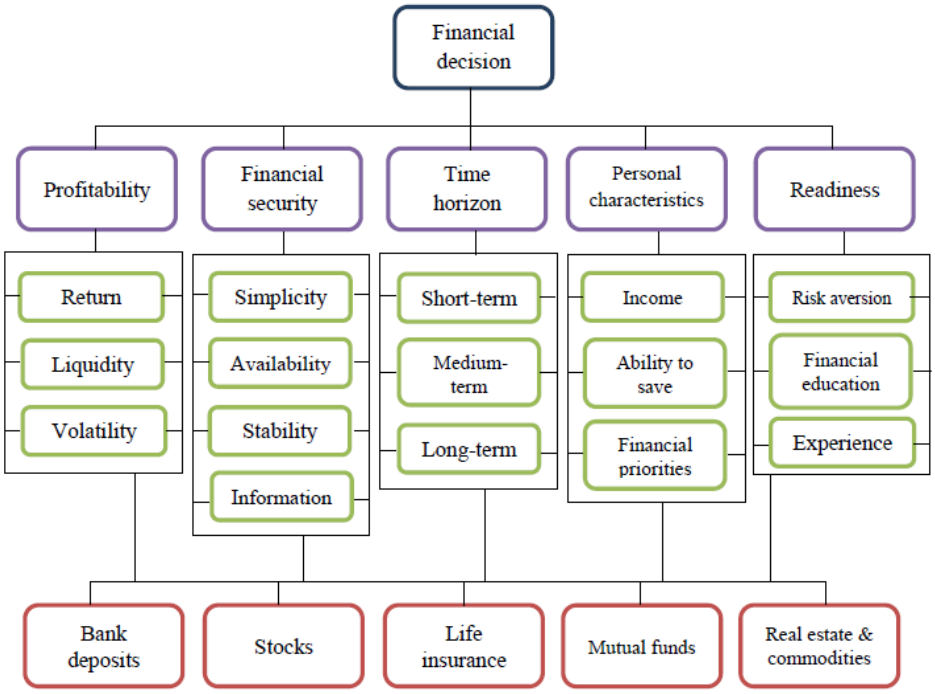

Figure 1 Hierarchy structure of our AHP model

Based on the obtained data from the respondents for the pair-wise comparisons for the sub-criteria, criteria and alternatives, we used the geometric mean to obtain the corresponding consensus (Aczel & Saaty, 1983). First, when evaluating the alternatives with regards to each of the sub-criteria in pair-wise comparisons, when taking the sub-criterion return into consideration, for example, the respondents found life insurance moderately more important than bank deposits; hence, the score for life insurance is 3, and for bank deposits is $\frac{1}{3}$. Likewise, investment in mutual funds is 4 times more preferable than bank deposits, or bank deposits are $\frac{1}{4}$ as preferable as investments in mutual funds. Following this procedure, 10 pair-wise comparisons of the alternatives were made for each of the 16 sub-criteria. Then, the sub-criteria were evaluated regarding the 5 main criteria. For example, when referring to the criterion of profitability, a total of 3 pair-wise comparisons were made. According to the respondents, return is moderately to strongly more important than liquidity, with a score of 4, hence the score of liquidity is $\frac{1}{4}$. As a result, liquidity is twice as preferred as volatility; therefore, liquidity is 2 and volatility is $\frac{1}{2}$. The criterion return is moderately to strongly more preferred than the criterion volatility, thus noting the score of 4 for return and $\frac{1}{4}$ for volatility. Table 1 shows the priorities of the criteria and their respective sub-criteria of the normalized matrix. Based on the priority vectors, the criterion respondents value the most is financial security (0.46505), with stability (0.55996) being the highest valued sub-criterion. This finding is in line with the findings of Gawlik (2019), who also focused on the young adult population. The consistency ratio is below 10% (7.67%), meaning the set of judgments is consistent, reliable and trustworthy.

Table 1
Prioritization of main criteria and sub-criteria

Criteria and sub-criteria	**Priorities**
Financial security	0.46505
Availability	0.17666
Information	0.17282
Simplicity	0.09056
Stability	0.55996
Personal characteristics	0.07974
Ability to save money	0.16342
Financial priorities	0.29696
Level of income	0.53962
Profitability	0.15442
Liquidity	0.20813
Return	0.66076
Volatility	0.13111
Readiness	0.25274
Experience	0.13650
Financial education	0.23849
Risk attitude	0.62501
Time horizon	0.04806
Long-term	0.10473
Medium-term	0.63699
Short-term	0.25829

Table 2 presents the local priorities of each alternative regarding each sub-criterion, as well as their overall priorities, from which the ranking is made. Thus, by using this model, the alternatives are ranked in order of the respondents' preference.

Table 2
Summarized results for the alternatives

Sub-criteria	Bank deposits	Life insurance	Mutual funds	Real estate and commodities	Stocks
Availability	0.36331	0.12011	0.36331	0.09782	0.05546
Information	0.11531	0.34887	0.34887	0.13938	0.04758
Simplicity	0.39135	0.07098	0.22831	0.26013	0.04924
Stability	0.17345	0.19643	0.06535	0.53112	0.03365
Ability to save money	0.26868	0.46974	0.06832	0.14536	0.04791
Financial priorities	0.15393	0.13340	0.26002	0.38916	0.06349
Level of income	0.19005	0.31085	0.31126	0.09253	0.09532
Liquidity	0.36957	0.05992	0.12822	0.13559	0.30670
Return	0.08883	0.22863	0.30442	0.07906	0.29906
Volatility	0.14220	0.10566	0.25502	0.45483	0.04229
Experience	0.43444	0.07786	0.19103	0.25529	0.04139
Financial education	0.37036	0.05936	0.21534	0.29752	0.05743
Risk attitude	0.17382	0.08846	0.15997	0.53621	0.04154
Long-term	0.06847	0.36043	0.15406	0.37359	0.04345
Medium-term	0.27619	0.05298	0.35456	0.14048	0.17579
Short-term	0.36161	0.04859	0.15118	0.08271	0.35591
Overall priorities	**0.21796**	**0.16637**	**0.20365**	**0.32388**	**0.08814**
Ranking	**2**	**4**	**3**	**1**	**5**

The results were obtained by using the SuperDecisions software. The graphical representation of the overall priorities of the alternatives is shown in Figure 2.

Based on the results in Table 2 and Figure 2, it can be seen that the first priority for the young adult population is investment in real estate and commodities (0.32388), followed by bank deposits (0.21796), and mutual funds (0.20365), although there is a slight difference between the second and the third priority. The respondents are the least interested in life insurance (0.16637) and investments in the stock market (0.08814).

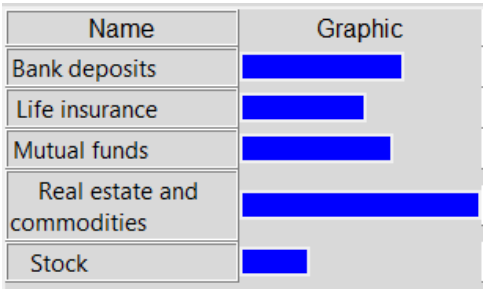

Figure 2 Graphical representation of the overall priorities of the alternatives in SuperDecisions

If an investor is willing to save and/or invest before deciding on an asset allocation, they should take into consideration a variety of characteristics such as their investment goals, available resources, the timeline in which they expect a return on investment, and their attitude towards risk. As a result, people can save or invest in a wide range of financial instruments in either the money market or the capital market, each with a different rate of return and thus a different degree of risk, depending on their utility perception, i.e., maximizing wealth. Similar to Anthony and Joseph (2017), we found that consumers' actions, behavior, attitudes and preferences are what ultimately shape their financial situation and well-being in the short-term and long-term, thus ultimately resulting in undertaking an action. If they prefer to prioritize short-term needs, then they are unlikely to focus on emergency savings or make long-term financial plans. According to the findings of research performed by the OECD (2020) on financial attitudes, only 25% of the population finds it more satisfying to save for the long-term rather than spending. Furthermore, 57% of the respondents focus on satisfying short-term financial needs instead of long-term financial goals. However, this is also related to the population's income level and saving patterns.

The obtained results show that the majority of the respondents value financial security the most. Therefore, in the proposed hypothetical situation, with those particular alternatives, they would have invested the hypothetical inheritance of 10,000 EUR in real estate or commodities at this stage of life because even if they were employed, with their current salaries, they could not save enough to buy a valuable and permanent asset. This finding is in line with Wu et al. (2012). The next choice would be saving in bank deposits, which is in line with the traditional propensity of Macedonians to use banks for saving despite the low interest rate environment. The banking sector in North Macedonia occupies the largest and most dominant part of the financial system, with constant growth in household deposits. However, the relatively low yields offered by deposit products increase the possibility of alternative ways of saving. Experience shows that a small percentage of investors make this decision because they consider alternative ways of investing as too risky or complicated. For example, mutual funds are an alternative investment, but despite being one of the fastest growing financial institutions in the last several years, their share of the assets of the financial system is still low; in contrast, their popularity worldwide is rapidly increasing, primarily among investors who are willing to take a bigger risk amid falling interest rates. Nonetheless, a small number of the respondents prefer investment in life insurance or on the stock market, partly because of their risk aversion, but also due to lack of information and financial knowledge. Although the insurance sector has significant potential for further development in both segments (life and non-life), the young adult population is more oriented towards non-life insurance products at this stage of life, which do not contain a savings/investment component. Life insurance is not very popular among young people because of the long period of time between investing and receiving the benefits. The significance of the capital market for the Macedonian financial system is small, primarily due to the modest supply of securities and the small volume of stock exchange trading in these instruments, meaning it is still underdeveloped. The lack of innovation and competitiveness of issuers, on the one hand, and the insufficient information and insecurity of potential investors in Macedonian companies, on the other hand, also have a certain influence on the underdevelopment of the domestic capital market. In addition to the modest supply of

attractive financial instruments, insufficient investment is a result of a low standard of living, the risk culture, and the traditional habits of consumption and savings.

Decision-making regarding personal finance among young adults is a multi-layered, social and economic issue, which is related to the level of youth unemployment and underemployment. Despite a slight decrease in the unemployment rate, youth unemployment is a major concern in the Macedonian economy. According to research conducted by Eurostat (2020), out of the analyzed countries, North Macedonia has the highest unemployment rate in the 15-29 age group (30.2%) and only one-fifth of young adults earn enough to make a living on their own. When it comes to decision-making regarding personal finance, another emerging problem is the lack of financial literacy in North Macedonia. Financial literacy is rapidly being recognized as a core skill, and is a combination of awareness, knowledge, skills, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial well-being. Hence, it is essential for consumers operating in an increasingly complex financial landscape. The average financial literacy score for the North Macedonian population is 11.8 out of a maximum 21 points. Compared to the average financial literacy score in the G20 countries (12.7), the overall financial literacy score in North Macedonia is 0.9 points lower, indicating the need to enhance financial literacy initiatives in the country (OECD, 2020). Financial literacy and knowledge certainly do not guarantee a secure future yield, but they are necessary in order to be informed and prepared.

4.1 Sensitivity analysis

The last step of the AHP analysis was performing a sensitivity analysis to show the effect that altering different parameters of the model would have on the choice of the best alternative with regards to personal finances. The sensitivity analysis is primarily conducted because the priorities of the alternatives are highly dependent on the weights assigned to the main criteria. Since these weights are usually based on highly subjective judgments, the stability of the ranking under varying criteria weights has to be tested (Chang et al., 2007). Figures 3-7 display a series of sensitivity analyses that were conducted to investigate the impact of changing the priority of the criteria on the alternatives' ranking. Therefore, two scenarios for each of the criteria were observed, with a total of 10 different scenarios being conducted.

First, the criterion of financial security was increased by approximately 25%, then that criterion was decreased by approximately 25%, and the obtained results are presented in Figure 3. The results of the sensitivity analysis revealed that a change in the first criterion has no significant influence on the importance of the alternatives, indicating that the overall rank of the final outcome remained unchanged in comparison to the ranking presented in Table 2.

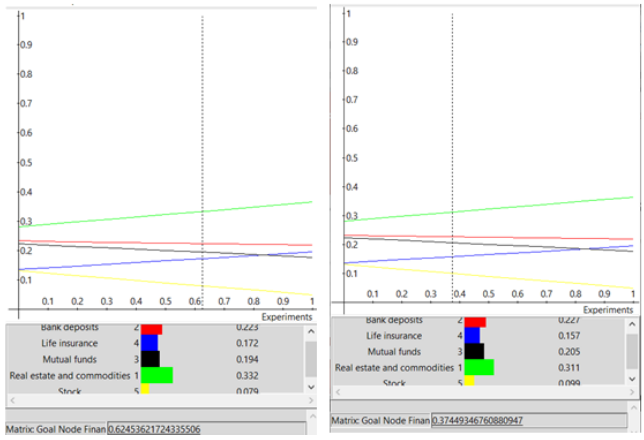

Figure 3 Performance sensitivity of alternatives when financial security is increased by 25% (left) and decreased by 25% (right)

Second, the criterion for personal characteristics was increased (left) and then decreased (right) by 25% (Figure 4). Consistent with previous findings, the 25% increase in this criterion appears to have a slight impact on the outcome with respect to alternatives 2 and 4. The 25% decrease in the criterion weight implies changes in the ranking of alternatives 2, 3 and 4, while the rest remain the same.

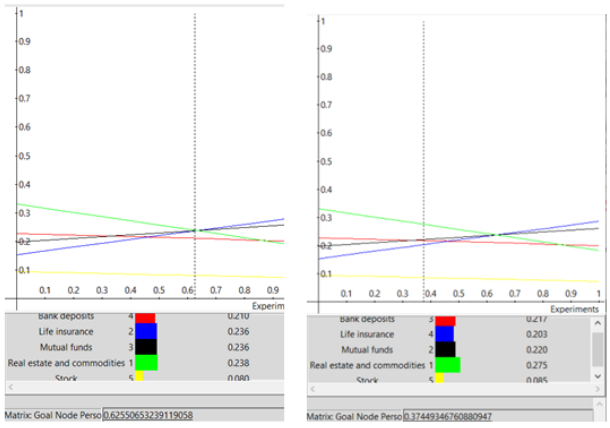

Figure 4 Performance sensitivity of alternatives when the personal characteristics criterion is increased by 25% (left) and decreased by 25% (right)

Third, the criterion for profitability was increased by 25% (left) and decreased by 25% (right), and the model was tested to see if the outcome changed (Figure 5). While the decrease in the criterion does not affect the priorities of the selective alternatives, the increase in the criterion changes the rankings for the alternative, except for the alternative bank deposits, which remains second.

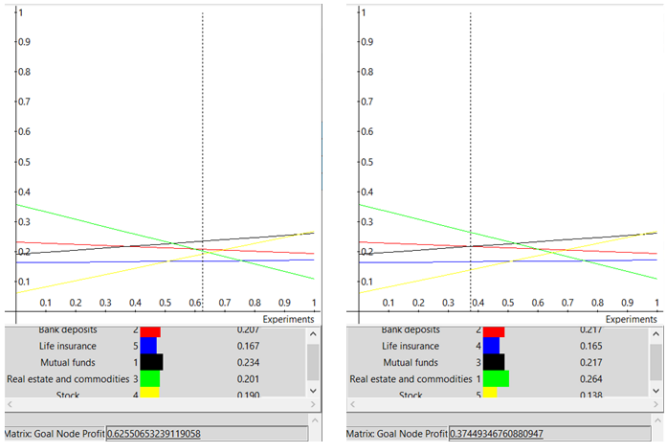

Figure 5 Performance sensitivity of alternatives when profitability is increased by 25% (left) and decreased by 25% (right)

The change in the criterion for readiness has no impact on the rank of the alternatives (Figure 6).

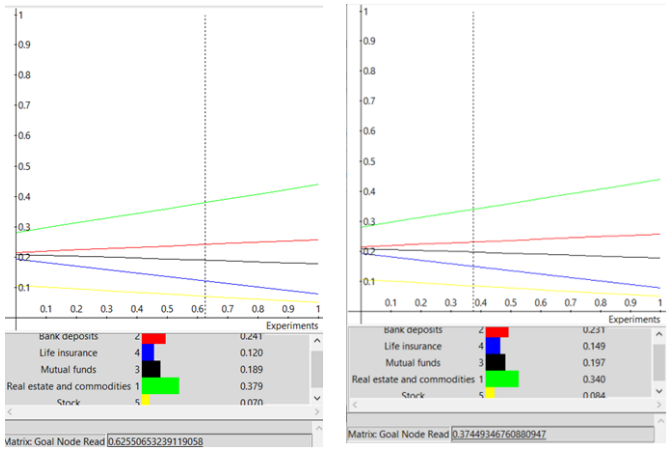

Figure 6 Performance sensitivity of alternatives when readiness is increased by 25% (left) and decreased by 25% (right)

Finally, the aforementioned scenarios were conducted for the criterion time horizon (Figure 7) as well. The changes do not affect the priorities of the selected alternatives when the time horizon is decreased by 25%. When the other scenario analysis is conducted, the ranking of the alternatives is changed so that the alternative bank deposits have the first rank, followed by mutual funds, real estate and commodities, stock and life insurance.

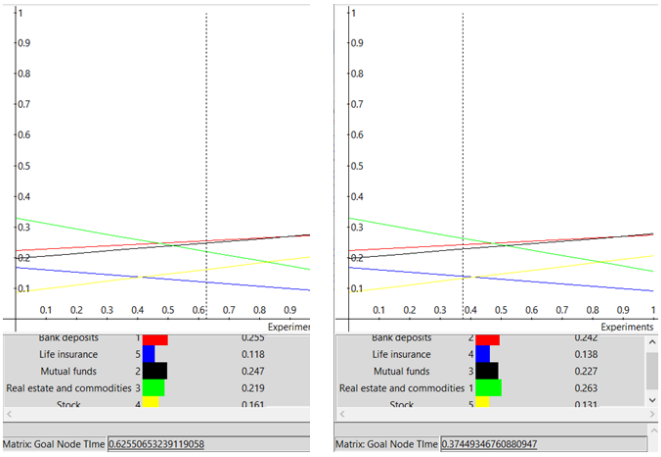

Figure 7 Performance sensitivity of alternatives when the time horizon is increased by 25% (left) and decreased by 25% (right)

Based on the performed sensitivity analysis scenarios, we conclude that the 25% change (increase and decrease) in the weight of the criteria for financial security and readiness has not changed the rank order of the five alternatives. Additionally, the decrease of 25% of the weight of the criteria for profitability and time horizon has not affected the rank of the alternatives either. In eight of ten scenarios, the alternative real estate commodities remains at the top, except when the profitability criterion is increased by 25%, in which case the mutual fund alternative is on the top; when the same scenario is repeated for the time horizon criterion, the bank deposits alternative is on the top.

5. Conclusion

In the current dynamic and turbulent environment, decisions are made under uncertainty and risk and people do not have all the necessary information and are not able to make a fully informed decision. Research and experience both indicate that investing in risky assets and diversifying the portfolio is a result of behavioral determinants such as risk attitude and emotions, while human factors, which introduce an additional layer of complexity into the risk process, are a very important part of financial decision-making.

The theory and practice of finance have evolved rapidly over the past couple of decades, thus creating a number of new opportunities and challenges for designing and implementing analytical tools for supporting financial decisions. Ever since their introduction, multi-criteria decision-making methods have been largely used among scholars and are currently experiencing the peak of their popularity, which leads to further development and sophistication. However, there is still room for improvement and development, especially in the area of finance.

The decision-making process in the area of finance is considered to be a cognitive process since the investors have to make a decision based on the various available alternatives. Investors usually have different risk attitudes, preferences, and perceptions of value as well as information asymmetries, and often behave irrationally and base their decisions on intuition. Irrespective of the goals, dealing with financial decisions in a

multidimensional setting can result in more informed outcomes. Therefore, the success in applying the model depends primarily on the researcher's ability to evaluate the alternatives while taking into account a number of criteria. That being the case, the AHP is considered one of the most prominent methods that enables evaluation of both quantitative and qualitative criteria on the same preference scale and has proved to be a relevant and useful approach in financial decision-making.

The sample in this research is comprised of the young adult population from the Republic of North Macedonia, who, because of the aging population and decrease in birth rates, is going to be the conduit of social and economic change, with further implications for the economy and financial system as its integral part. Undoubtedly, everyone is aware that a certain degree of risk is an integral component in every segment of life and work, regardless of the type of decision. Hence, each individual is risk-tolerant, but to some extent, proactive. In order to examine the variety of factors that affect personal decision-making, we developed an AHP model to synthesize the complex decision-making process in the area of personal finance. It consists of 5 criteria with their respective sub-criteria, and 5 alternatives, evaluated with respect to the goal of making a better and fact-based decision regarding personal finances. Based on the obtained results, young adults prefer investment in real estate and commodities rather than the other alternatives. Young adults today have great confidence in the banking sector. However, the relatively low yields offered by deposit products increase the possibility of alternative ways of saving, hence the third choice of investment in mutual funds. A small number of the respondents prefer investment in life insurance or on the stock market, partly because of their risk aversion, but also due to lack of information and financial knowledge. The results are in line with the macroeconomic trends in the Macedonian economy. Given unemployment and underemployment rates, young adults are less inclined to save or invest, especially in the more complex financial instruments. That being the case, this research is relevant to the extent that it brings about a better understanding of how individuals make financial decisions, which may allow financial institutions and governments to design programs in order to promote financial inclusion, improve financial literacy, and encourage people to make better decisions, particularly in developing economies. Moreover, unemployment and underemployment generate dissatisfaction and support the necessity for more aggressive youth employment policies composed of internship and training programs, qualification, re-training and profiling of the youth into sectors and occupations that require additional workforce. More measures like this are urgently needed because of the rising trend of highly-skilled brain drain that results in highly trained and qualified people emigrating from the country. Only by implementing such programs and activities can economic development be accomplished and a democratic and inclusive society be achieved.

Future investigations are necessary to validate the kinds of conclusions that can be drawn from this study. Future research could fruitfully explore this issue by comparing the ideal investment of the young adult population with an ideal investment proposed by financial experts and advisors. Therefore, different perspectives and priorities will be obtained. Deviations in the decisions of young adults from the best solution proposed by financial analysts can be identified, and accordingly, certain advice will be given in order to improve decision-making regarding personal finances.

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APPENDIX I

First-stage, Questionnaire 1

1. Gender
    a. Male
    b. Female
2. Age
    a. Less than 25 years old
    b. From 26 to 30 years
    c. From 31 to 35 years
3. Education
    a. High School
    b. Bachelor of Science/College/University
    c. Master of Science
4. Are you familiar with the following financial products (their characteristics and conditions)?

A savings account	□ Yes	□ No
Bonds	□ Yes	□ No
Stocks and shares	□ Yes	□ No
A pension fund	□ Yes	□ No
An investment fund	□ Yes	□ No
Life insurance	□ Yes	□ No
Real estate	□ Yes	□ No
Commodities	□ Yes	□ No
Futures	□ Yes	□ No
Options	□ Yes	□ No

5. Have you recently held any of the following financial products?

A savings account	□ Yes	□ No
Bonds	□ Yes	□ No
Stocks and shares	□ Yes	□ No
A pension fund	□ Yes	□ No
An investment fund	□ Yes	□ No
Life insurance	□ Yes	□ No
Real estate	□ Yes	□ No
Commodities	□ Yes	□ No
Futures	□ Yes	□ No
Options	□ Yes	□ No

6. Please answer the following attitude and behaviour statements (multiple answers are possible)
    a. Before I buy something, I carefully consider whether I can afford it.
    b. I tend to live for today and let tomorrow take care of itself.
    c. I find it more satisfying to spend money than to save it for the long term.
    d. I pay my bills on time.
    e. I am prepared to risk some of my own money when saving or making an investment.
    f. I keep a close personal watch on my financial affairs.
    g. I set long term financial goals and strive to achieve them.
    h. Money is there to be spent.

7. Which sources of information do you feel most influenced your decision about which one to take out?
    a. Product-specific information obtained in a branch or from sales personnel
    b. The internet
    c. The financial pages of newspapers
    d. Specialist magazines
    e. Recommendations from an independent financial adviser or broker
    f. Advice of friends/relatives
    g. Television or radio programmes and/or adverts
    h. My own previous experience
8. Please indicate the relative importance of each of the following personal objectives to you:
    a. Saving money regularly
    b. Making a major purchase (e.g., second home, car)
    c. Taking a dream vacation
    d. Develop or revise your investment strategy
    e. Providing a more comfortable life
    f. Making gifts to relatives
    g. Providing for your family
9. Please indicate the relative importance of each of the following investment objectives by using a scale of 1 (strongly disagree) to 5 (strongly agree).
    a. Return: dividends or interest to spend and/or reinvest
    b. Liquidity: the ability to quickly convert the investment into cash
    c. Volatility: the level of risk associated with price changes
    d. Simplicity: full understanding of a financial product
    e. Availability: can be purchased or invested in easily
    f. Stability: little or no danger of losing the investment
    g. Information: valuable and on-time information
10. What time-frame do you prefer for your investment?
    a. Short-term investment
    b. Medium-term investment
    c. Long-term investment
11. Please indicate the relative importance of each of the following personal characteristics important for financial decision-making by using a scale of 1(strongly disagree) to 5 (strongly agree)
    a. Income
    b. The ability to save
    c. Financial priorities
    d. Risk aversion
    e. Financial education
    f. Experience

APPENDIX II

Second-stage, AHP-based questionnaire

Please make the following pair-wise comparisons, by using the fundamental scale, from 1 to 9.

1. Pick one of the alternatives (from the left or from the right side) and choose how much more you prefer the selected alternative, regarding the sub-criteria **return**?

Bank deposits								Life insurance
1	2	3	4	5	6	7	8	9
Bank deposits								Mutual funds
1	2	3	4	5	6	7	8	9
Bank deposits								Real estate and commodities
1	2	3	4	5	6	7	8	9
Bank deposits								Stocks
1	2	3	4	5	6	7	8	9
Life insurance								Mutual funds
1	2	3	4	5	6	7	8	9
Life insurance								Real estate and commodities
1	2	3	4	5	6	7	8	9
Life insurance								Stocks
1	2	3	4	5	6	7	8	9
Mutual funds								Real estate and commodities
1	2	3	4	5	6	7	8	9
Mutual funds								Stocks
1	2	3	4	5	6	7	8	9
Real estate and commodities								Stocks
1	2	3	4	5	6	7	8	9

2. Regarding **profitability** as one of the main criteria, pick the sub-criterion (left or right) that is more important to you when making financial decisions and choose how much more.

Return								Liquidity
1	2	3	4	5	6	7	8	9
Return								Volatility
1	2	3	4	5	6	7	8	9
Liquidity								Volatility
1	2	3	4	5	6	7	8	9

3. Having in mind the goal: How to invest/save the inherited 10.000 EUR, pick the criteria that you find more important and indicate how much more.

Financial security								Personal characteristics
1	2	3	4	5	6	7	8	9
Financial security								Profitability
1	2	3	4	5	6	7	8	9
Financial security								Readiness
1	2	3	4	5	6	7	8	9
Financial security								Time-horizon
1	2	3	4	5	6	7	8	9
Personal characteristics								Profitability
1	2	3	4	5	6	7	8	9
Personal characteristics								Readiness
1	2	3	4	5	6	7	8	9
Personal characteristics								Time-horizon
1	2	3	4	5	6	7	8	9
Profitability								Readiness
1	2	3	4	5	6	7	8	9
Profitability								Time-horizon
1	2	3	4	5	6	7	8	9
Readiness								Time-horizon
1	2	3	4	5	6	7	8	9